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A CATALOGUE OF SOLAR COSMIC RAY EVENTS IMPS IV AND V (MAY 1967-DEC. 1972)

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JANUARY 1974

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GODDARD SPACE FLIGHT CENTER

GREENBELT, MARYLAND

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A CATALOGUE OF SOLAR COSMIC RAY EVENTS

IMPS IV AND V

(MAY 1967 - DEC. 1972)

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GODDARD SPACE FLIGHT CENTER
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INTRODUCTION

This catalogue of solar cosmic ray events has been prepared for the use of solar physicists and other interested scientists. It contains some 185 solar particle events detected by the Goddard Space Flight Center Cosmic Ray Experiments on IMP's IV and V (Explorer 34 and 41) for the period May 1967 - December 1972. An event is defined as an increase in the flux of 20-80 MeV protons which exceeds 10^{-4} Protons/cm^2-sec-sr-MeV and lasts for more than 5 hours. The threshold is a function of the detector sensitivity and background. The minimum increase over this energy range corresponds to about 5% of the total galactic cosmic ray intensity at 1 AU. The data is presented in the form of hourly averages for three proton energy intervals - 0.9 - 1.6 MeV; 6 - 20 MeV and 20 - 80 MeV. In addition the time histories of .5 - 1.1 MeV electrons are shown on a separate scale. To assist in the identification of related solar events, the onset time of the electron event is indicated. The details of the instrumentation and detector techniques are described in Section I. Further descriptions of data reduction procedure and on the time-history plots are given in Section II.

I. Detector System and Satellite Instrumentation

The Cosmic Ray Detector System described here used two dE/dx vs. E telescopes which covered the energy ranges 20 - 80 MeV/nucleon and 4 - 20 MeV/nucleon. The experiments flown on IMP's IV and V were essentially identical.

The dE/dx vs. E telescope is of greatest importance in studying low energy cosmic rays (i.e.< 100 MeV). This device measures two parameters for a given charged particle passing through the telescope which makes it possible to determine the energy of the particle and its charge and mass. A schematic of such a device is shown in Figure 1. The basic features of any such telescope are the three separate detectors labeled A, B, and C in the diagram.

Consider a particle having a trajectory such as the one labeled 2 in the schematic. The range of this particle would be greater than the thickness of A, but less than the thickness of A and B taken together. Such a trajectory may be termed a stopping trajectory as opposed to penetrating trajectories such as the tracks labeled 3 and 4. Detector A is usually about 5 - 10% of the thickness of B. As a charged particle of kinetic energy E penetrates detector A it deposits an amount of energy ΔE. It then enters B and comes to rest giving up the remainder of its kinetic energy (E - ΔE) therein. The energy deposited in each of these detectors produces electrical signals which may be amplified and analyzed. For example, if A and B are made of scintillator material the number of photons emitted will be proportional to the energy deposited and hence can be detected and amplified by means of photomultipliers looking at each detector. The measurement of ΔE and E - ΔE can indeed determine the charge and mass of the particle. The plots of several of these relations are shown in Figure 2. The solid curves represent the ΔE versus E - ΔE responses for stopping particles, while the dashed curves show the continuation of the response for penetrating particles. The stopping particle events are identified by the logic requirement $AB\bar{C}$. In Figure 1 it is seen that of the four tracks shown only track 2 would satisfy this logical criterion. By restricting the analysis of events to those of stopping particles the following points are noted:

1. The energy falls within the limits defined by the thickness of the two detectors A and B.

2. Analyzed particles must enter the telescope within an aperture cone defined by the diameters and separation of the detectors A and B.

3. Spurious events are kept to a minimum by the anticoincidence requirement on detector C.

4. The particles of different z and m will be easily distinguishable because of their different lines.

It should also be noted that for either stopping or penetrating particles, continuous in-flight calibration of the detectors and their associated electronics is provided because of the unique "endpoint" existing for each stopping particle. This endpoint is defined by the materials and geometry of a particular telescope and must represent a unique incident energy for a given species of particle.

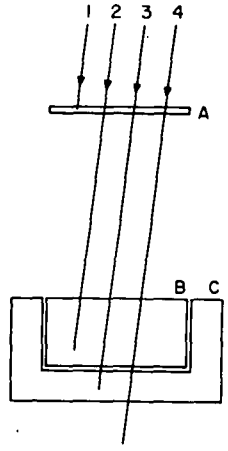


Figure 1. Schematic of ΔE vs. E - ΔE particle telescope. A denotes detector measuring ΔE and B the detector measuring E - ΔE. C is the anti-coincidence detector.

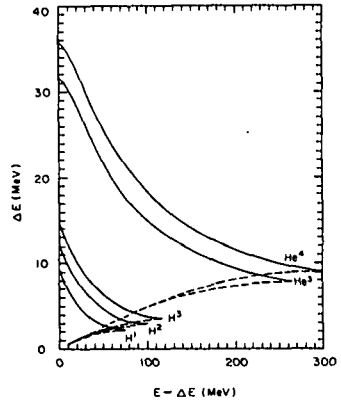


Figure 2. ΔE versus E - ΔE response curves for hydrogen and helium isotopes for the scintillator telescope used on IMP-IV and IMP-V.

AI. Medium Energy Detector: The thin dE/dx or ΔE element as well as E, (E - ΔE), detector were CsI scintillators with an anti-coincidence plastic scintillator partially enclosing the E detector. It is designed to detect stopping protons and alphas in the 20 - 80 MeV/nucleon range. The axis of the detector is along the spacecraft spin axis which is normal to the ecliptic plane. The dE/dx element is also used as an electron detector over the energy range 0.5 - 1.1 MeV.

A mechanical layout of the MED telescope used in both the IMP-IV and IMP-V experiments is shown in Figure 3. As seen, an incident stopping particle would enter the telescope from the right penetrating the light baffle and passing into the A detector labeled ΔE scintillator in the figure. The particle would continue through the second light baffle and stop in the B detector labeled as the E - ΔE scintillator. Note that each of the three photomultiplier tubes is coupled through the open region adjacent to each of the three detectors. As shown the assembly is very compactly designed with associated high voltage power supplies and pre-amplifiers attached to the photomultiplier housing.

In order to accurately compute the response curve ΔE versus (E - ΔE) as shown in Figure 2 it is necessary to take into account all of the material in a particle track through the telescope up to but not including the C detector. The aluminum and plastic foam sandwich shown in front of the A detector and the one between the A and B detectors are

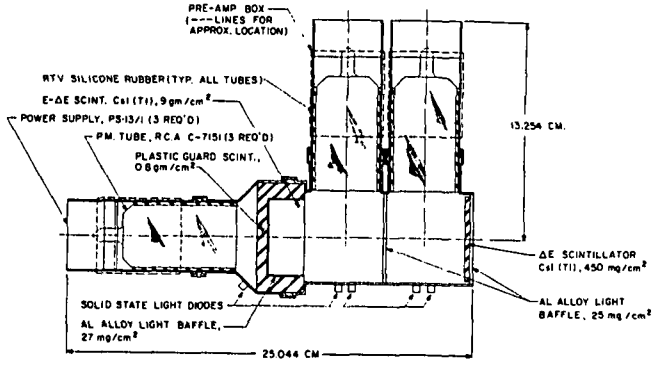


Figure 3. Schematic of IMP scintillator telescope assembly.

primarily responsible for the flattening of the curves at small energies. An average path length of $L/\langle\cos\theta\rangle = 1.02\ L$ was used in calculating the detector response.

The geometry factors for varying penetration depths of tracks into the B detector were computed. These are plotted in Figure 4, which has specific incident energies marked along the curve indicating the incident energy of a particle having that geometry factor.

The actual telescope had a threshold for particle detection in the $AB\bar{C}$ mode of 18.7 MeV/nucleon and the cutoff for the C detector anti-coincidence occurred at 81.6 MeV/nucleon.

The counts of $AB\bar{C}$ particles were accumulated for 4.48 seconds intervals for IMP-IV and two 4.48 seconds intervals for IMP-V every 2.73 minutes. The relative contribution of the count rate of various species (here protons from 19 to 81.6) and energy spectral information were determined by 1024 channel pulse height analysis performed simultaneously on the output of both CsI scintillators at the rate of 8 times every 2.73 minutes for IMP-IV and 16 times for IMP-V.

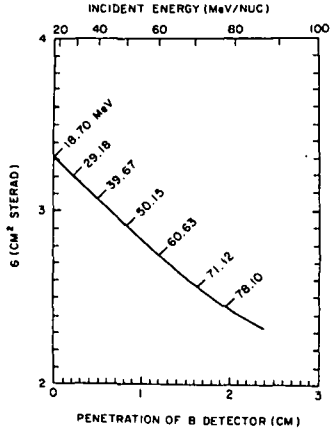


Figure 4. Geometry factor G versus penetration of particle into B detector for IMP scintillator telescope.

A2.

The front detector A from MED telescope provided data for the .5 to 1.1 MeV electrons. MED A is a CsI crystal with a thickness of ~.1 cm eccofoam sandwiched in between two ~.0023 cm Al foils. The geometrical factor of MED A is ~60 cm^2-ster. The signals from MED A are amplified and counted via various discriminators levels. There are 4 discriminators for MED A. They are called A0, --, A3. The corresponding threshold levels in keV are approximately 130, 610, 1260 and 1760 in sequential order. However, because of the thick window in front of the detector, electrons are not detected unless their kinetic energy is ≥400 keV. Figure 5 shows the electron detection efficiency for A_0-A_1. Clearly, the difference in counting rates from A_0 and A_1 levels is due to electrons in the energy range of ~500-1100 keV. Although the detection efficiency for electrons with energy ≥ 1100 keV is not small, it is neglected because of the steeply falling spectrum for electrons of solar origin.

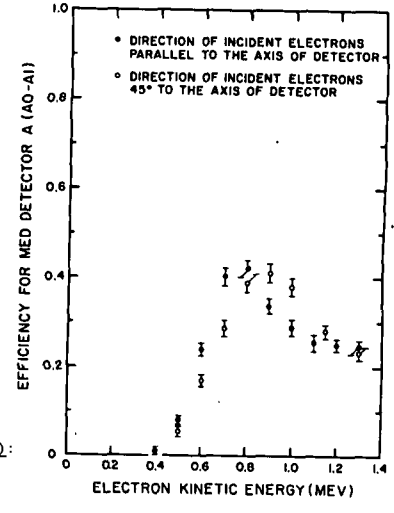


Figure 5. Efficiency for the MED (A-A1) detector.

B1. Low Energy Detector (L.E.D.): This uses a thin (150 micron) solid state detector for the dE/dx measurement with a thick E - ΔE solid state device. The nominal energy interval for stopping particles extended from 4 to 20 MeV/nucleon. A schematic of the mechanical design of the telescope assembly is shown in Figure 6. The partial mechanical collimator in front of the dE/dx detector made possible the measurement of 0.6 - 4 MeV proton by single parameter analysis during solar events.

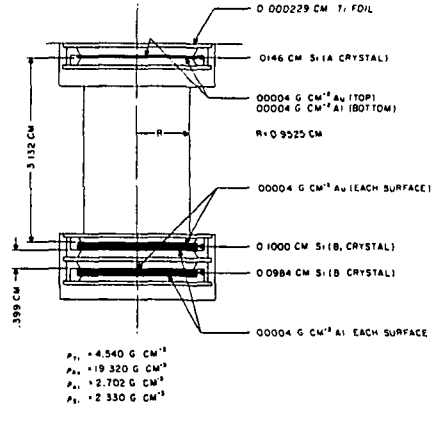


Figure 6. Schematic of IMP-IV solid state detector telescope showing critical dimensions and composition of layers.

The dE/dx or A detector and the E - dE/dx or B detector were mounted in the two ends of a cylindrical plastic scintillator with a plastic plug of the same material after B. The signals from the solid state detectors were fed into charge sensitive preamplifiers since the number of charge pairs created by an ionizing particle would be proportional to the energy it deposited. The plugged end of the C detector was coupled to a photomultiplier. As in the case of the scintillator telescope described above the $AB\bar{C}$ logic was invoked to discriminate against all but particles coming to rest in detector B after having passed through A.

Note the titanium foil light shield in front of the A detector because of the sensitivity of silicon detectors to light. Also note that each of the silicon detectors has a layer of gold and aluminum on front and back surfaces, respectively. The average obliquity factor for this assembly was $1/\langle\cos\theta\rangle = 1.04$. With this factor applied to the thickness of material shown in Figure 6, the range energy program mentioned in the last section was used to compute the response curves similar of those for MED Figure 2.

Counts of the $AB\bar{C}$ particle rates were accumulated for a 4.48 seconds interval once every 2.73 minutes. The relative contribution of each count rate of proton within $4.2 \leq E < 19.1$ MeV and energy spectral information were determined by 1024 channel pulse height analysis performed simultaneously on the output of the solid state detectors every 2.73 minutes, 4 times for IMP 4 and 8 times for IMP 5.

B2.

The front dE/dx detector from the LED provided data for the low energy .9 to 1.6 MeV protons. LED A is a totally deflected surface barrier AU-Si detector of thickness ~.0145 cm protected in the front by a .00023 cm Ti foil. The geometric factor for LED A is ~ 4.25 cm^2-ster. Protons stopping in this thin detector (or particles penetrating it) were measured by passing the output signal through an eight-level energy threshold discriminator called D1, ..., D8. The energy thresholds in keV for D1, ..., D8 are in sequential order, 6060, 4888, 2580, 1420, 930, 740, 410 and 210 for IMP 4 and slightly different for IMP 5. Data from any one level were accumulated for 4.48 seconds interval once every 2.73 minutes. Since LED A is a thin detector only D8 has enough sensitivity for electron detection. For D7 and higher energy threshold levels, the electron detection was observed to be less than 1%. Therefore, the counting rate D6-D4 free of electron contribution has been used to cover the proton energy range from ~ .9 to 1.6 MeV.

Note again that this LED telescope is scanning essentially the ecliptic plane. A complete block diagram of the experiment electronics for both detectors is given in Figure 7.

Satellites

The IMP IV satellite was launched on May 24, 1967 into a high inclination elliptic orbit with initial perigee ~ 270 km and an apogee between 33.4 and 34 earth radii. The spin axis was approximately normal to the ecliptic plane and the orbital period was ~ 104 hours. From January to May 1968 and from February to May 1969 the trajectories of the satellite were in the tail region of the magnetosphere. The experiments providing the data published here performed well from the launch to the date of the spacecraft re-entry on May 3, 1969.

The IMP-V satellite was launched on June 21, 1969 leaving a gap of few important solar events in May and beginning June 1969. The satellite orbit was also elliptic with an apogee from 28.2 to 28.6 earth radii and an initial perigee of ~270 km. Again the spin axis is approximately perpendicular to the elliptic plane and the orbital period is ~81.5 hours. The periods for which the trajectories of the spacecraft were in the geomagnetic tail are roughly from December through March each year. Except for a period of 2 weeks in March 1970 when the LED data were noisy, all the detectors providing the results published here have functioned well from launch through December 24, 1972, when IMP-V re-entered the Earth's atmosphere.

II. Data Description

We have attempted to identify each discrete event whose intensity above 20 MeV exceeded 10^{-4} Protons/cm^2-sec-Sr-MeV for a period of more than 5 hours. This requirement for a measurable flux above 20 MeV eliminates most co-rotating events. The plot for each event includes the hourly averages of the three proton energy intervals as well as the .5 - 1.1 MeV electrons.

When possible, the onset time has been defined by the electron component (average velocity = ~ 0.9C). This time is indicated on the frame by an arrow along with the precision of the measurement. This precision is a function of the rate of increase and the event size. When this time is not available or when the amplitude of the electron intensity increase is too small to be seen on the hourly average plot, the 19-80 MeV proton onset time is indicated.

The proton intensity is plotted in 3 energy ranges, namely: .9 - 1.5 MeV, 6 to 19 MeV, and 19 to 80 MeV on a logarithimic scale from 10^{-5} to 10^4 proton/sec cm^2 -sr.MeV. The logarithimic scale of the .5 to 1.1 MeV electrons intensity is either .5 to 15 electrons/sec cm^2 sr-MeV or 10^{-1} to 10^4 electrons/sec.cm^2-sr MeV depending on the size of each individual event. It was found convenient to standardize at 10 the maximum number of days shown per frame. This time scale shows most of the particle events with a good resolution from the onset of the event until the time when the intensity is back to the galactic level. In those cases where the event lasts longer, the time history is continued on the following page. Also, there are events which start while the particles of the previous event are still present and are being recorded by the detectors. Those "superposed events" are not separated in an independent frame. Rather, they are shown in sequence. If multiple plots are required, then some days from the previous frame may be repeated in order to put the next event in perspective.

For clarity, vertical lines have been drawn to separate each day. It is obvious that twenty four hourly average points for each particle intensity level should be included between two lines - unfortunately, because of telemetry gaps, points are sometimes missing. It should not be any problem to locate those missing points. A period of ~ 8 hours of missing data takes place during the perigee passages of the satellite. Those have been indicated by a heavy horizontal bar on the bottom line of the frame. Note that there can be longer periods of missing .5 - 1.1 MeV electrons near the perigee. Those correspond to trapped electrons in the magnetosphere which have been removed from the plot. Of course, the duration of those periods depends on the satellite trajectory. During a few large events the MED detector was saturated near the intensity maximum. As a result the .5 to 1.1 MeV electrons and the 19 - 80 MeV protons intensities are not available during those saturation periods. This has been indicated on the frame.

As some features in the intensity variations may be due to interplanetary magnetic field perturbations, the often related storm or sudden commencement, when available, has been indicated on the frame. Four isolated micro events with a too short time to be put on an independent frame have been transferred to the end of the catalogue - those events are November 1, 1970; December 6, 1970; January 14, 1971 and July 24, 1971

An experiment such as this represents the combined efforts of many individuals; in particular, Ciro Cancro and Paul Janniche in the design, development and testing of the electronics, and Anthony Flanick and his co-workers for the assembly and test of the detector assemblies. Many of the computer analysis programs were developed by Dr. James H. Kinsey and significant parts of the experiment description were taken from his PhD thesis. We would also like to express our thanks to Miss Kathy Watts for her work in the preparation of this catalogue.

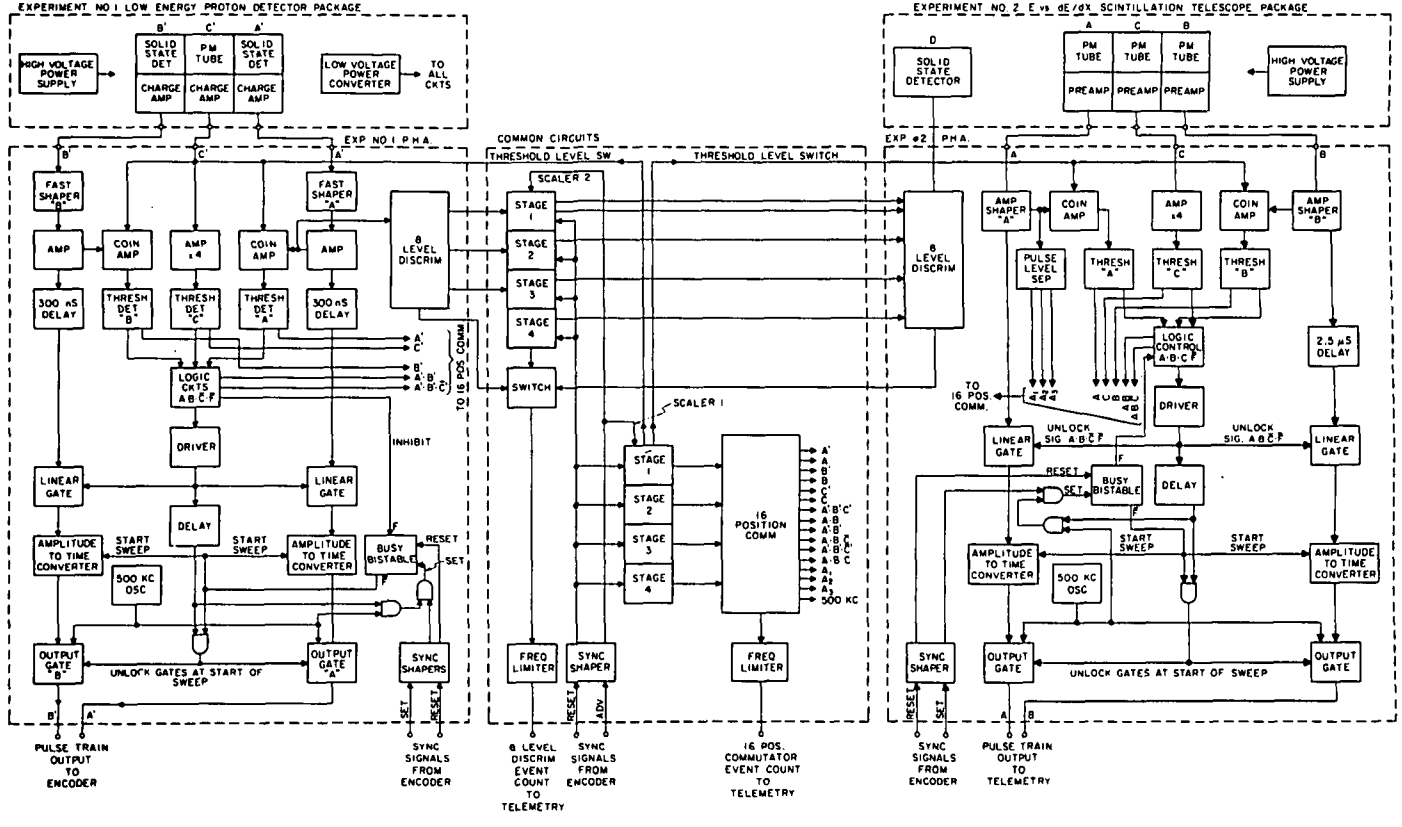
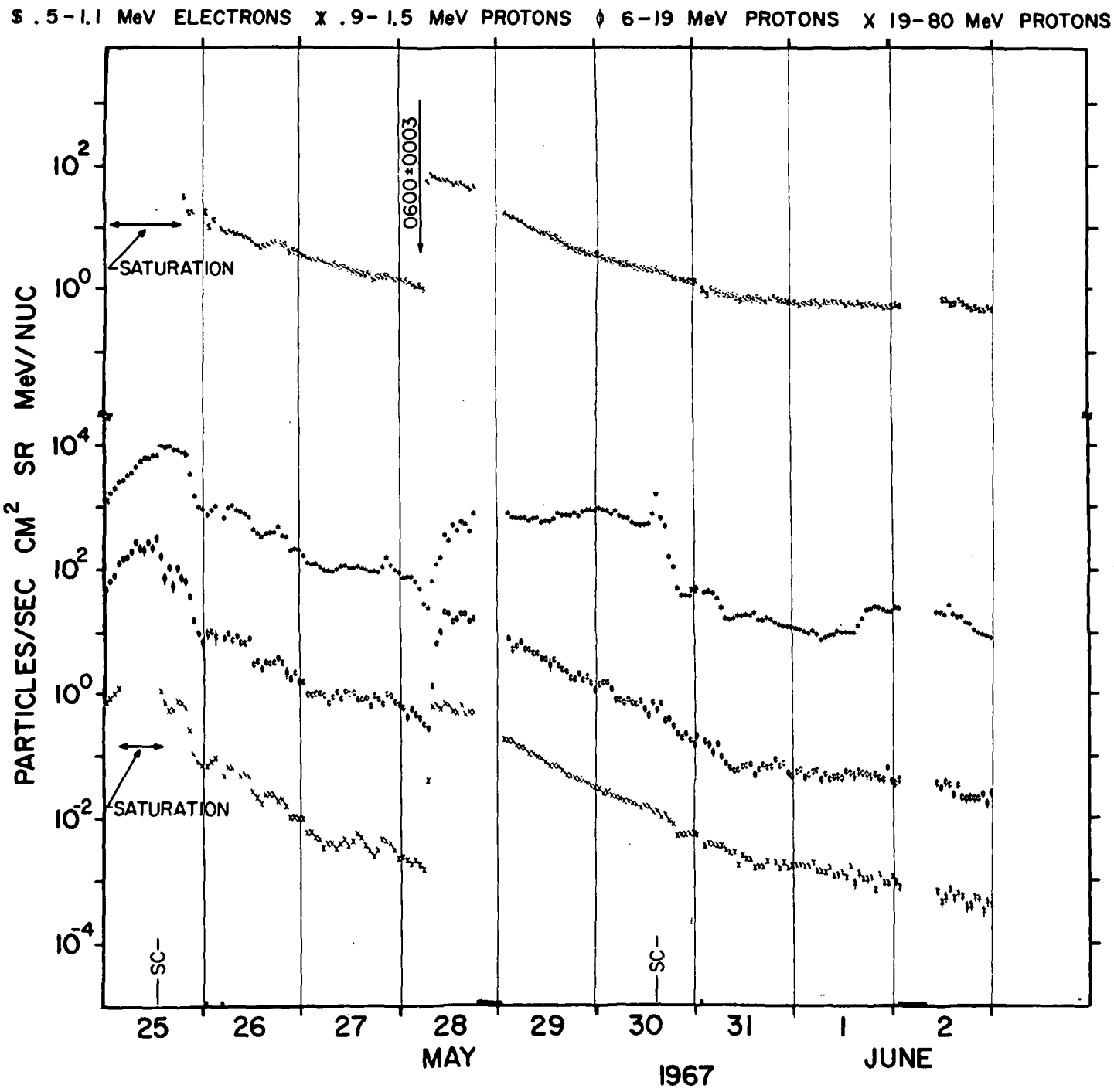
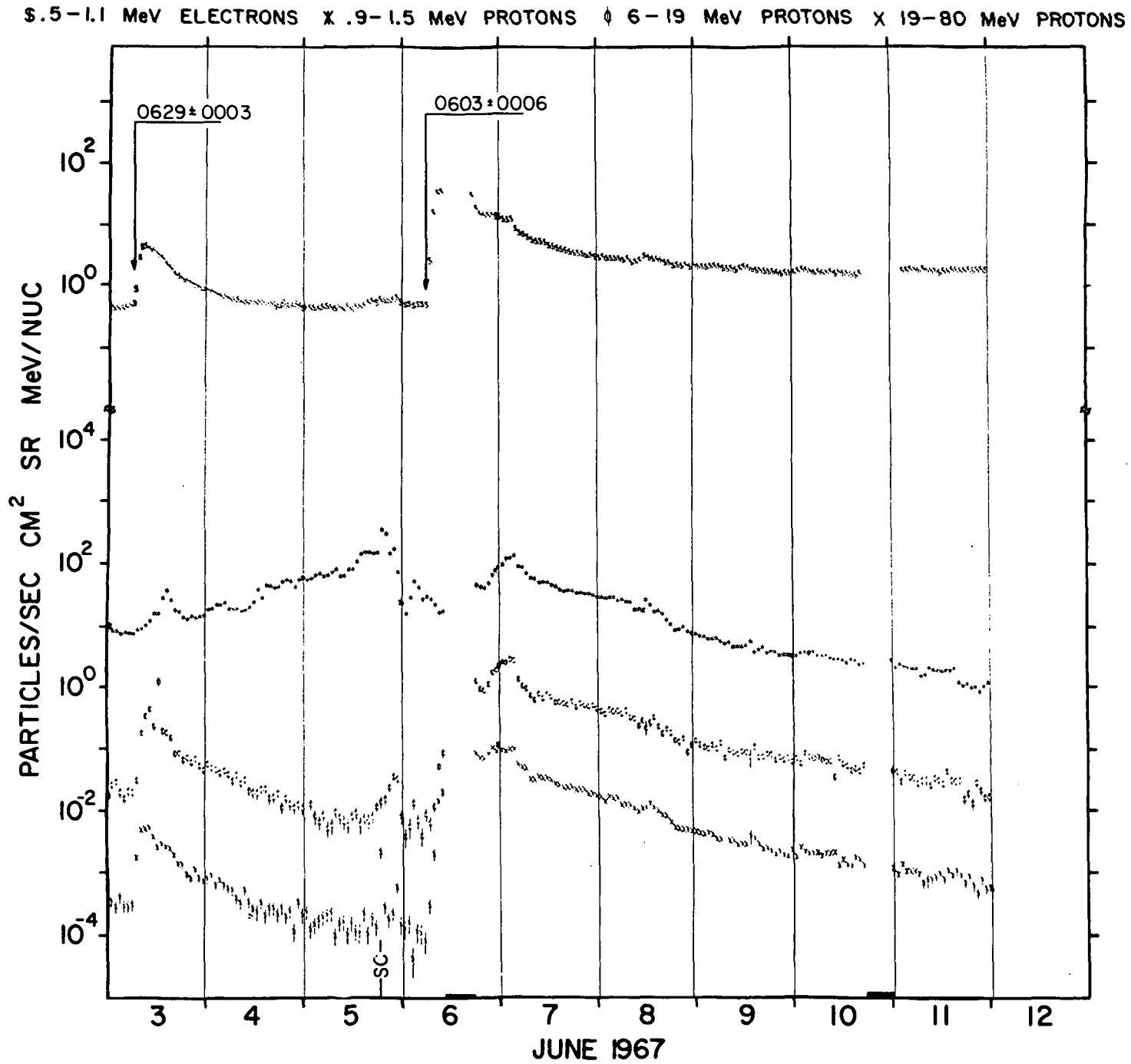
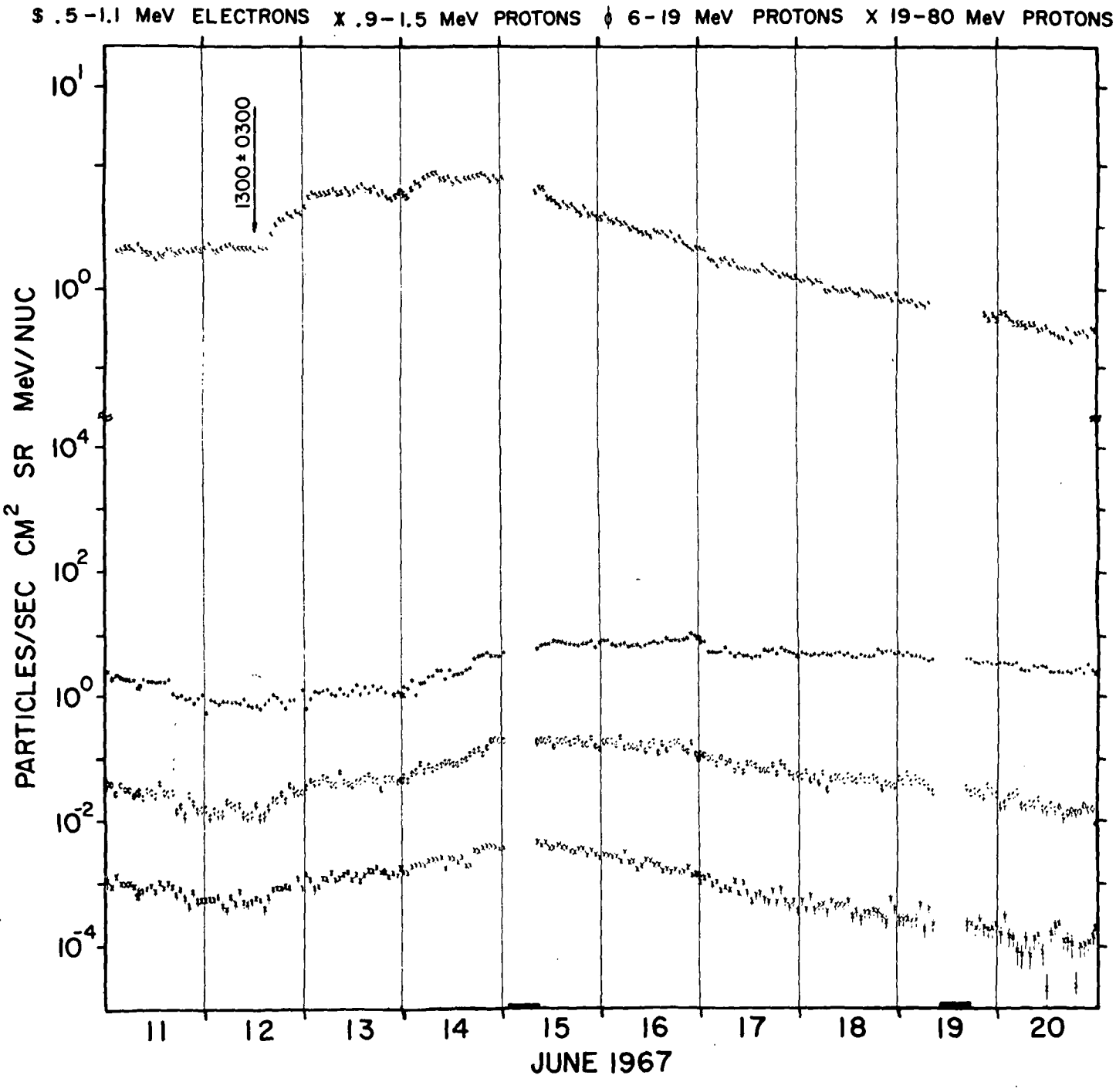


FIG. 7 BLOCK DIAGRAM OF IMP-IV COSMIC RAY EXPERIMENT ELECTRONICS

FRAME NUMBER	INCLUDING DATES	
1	1967	May 25 - June 02
2		June 03 - June 11
3		June 11 - June 20
4		July 04 - July 11
5		July 29 - Aug. 06
6		Aug. 07 - Aug. 14
7		Aug. 17 - Aug. 22
8		Oct. 28 - Nov. 06
9		Nov. 06 - Nov. 15
10		Nov. 15 - Nov. 23
11		Dec. 02 - Dec. 08
12		Dec. 11 - Dec. 15
13		Dec. 15 - Dec. 24
14	1967-68	Dec. 28 - Jan. 02
15	1968	Jan. 11 - Jan. 16
16		Feb. 01 - Feb. 10
17		Feb. 12 - Feb. 19
18		Feb. 21 - Feb. 28
19		March 06 - March 11
20		March 21 - March 23
21		April 21 - April 30
22		June 08 - June 16
23		June 26 - June 29
24		July 05 - July 14
25		July 11 - July 20
26		July 25 - Aug. 03
27		Aug. 02 - Aug. 11
28		Aug. 11 - Aug. 20
29		Aug. 19 - Aug. 24
30		Aug. 28 - Sept. 06
31		Sept. 25 - Oct. 04
32		Oct. 02 - Oct. 10
33		Oct. 23 - Nov. 01
34		Nov. 01 - Nov. 10
35		Nov. 10 - Nov. 17
36	1968	Nov. 17 - Nov. 26
37		Dec. 02 - Dec. 11
38		Dec. 10 - Dec. 19
39	1968-69	Dec. 26 - Jan. 01
40	1969	Jan. 23 - Jan. 28
41		Feb. 24 - March 05
42		March 11 - March 18
43		March 20 - March 29
44		March 29 - April 07
45		April 08 - April 17
46		April 17 - April 26
47		April 24 - May 03
48		Sept. 09 - Sept. 18
49		Sept. 24 - Oct. 03
50		Oct. 13 - Oct. 17
51		Nov. 01 - Nov. 10
52		Nov. 11 - Nov. 20
53		Nov. 21 - Nov. 30
54		Nov. 29 - Dec. 06
55		Dec. 17 - Dec. 24
56	1969-70	Dec. 30 - Jan. 08
57	1970	Jan. 28 - Feb. 06
58		Feb. 15-18; Feb. 25-28
59		March 04 - March 13
60		March 20 - March 29
61		March 28 - April 06
62		April 05 - April 14
63		April 13 - April 20
64		May 04 - May 13
65		May 29 - June 07
66		June 14 - June 22
67		June 25 - July 04
68		July 06 - July 11
69		July 22 - July 29
70		Aug. 09 - Aug. 18
71	1970	Aug. 18 - Aug. 27
72		Nov. 04 - Nov. 13
73		Nov. 14 - Nov. 22
74		Nov. 22 - Nov. 27
75		Dec. 11 - Dec. 19
76	1970-71	Dec. 23 - Jan. 01
77	1970-71	Dec. 28 - Jan. 05
78	1971	Jan. 24 - Feb. 02
79		Feb. 01 - Feb. 10
80		April 01 - April 10
81		April 20 - April 25
82		May 11 - May 20
83		June 29 - July 02
84		Sept. 01 - Sept. 10
85		Sept. 10 - Sept. 19
86		Sept. 24 - Sept. 27
87		Oct. 02 - Oct. 11
88	1972	Feb. 08 - Feb. 16
89		Feb. 17 - Feb. 26
90		March 05 - March 14
91		March 27 - March 30
92		April 17 - April 24
93		April 25 - April 29
94		May 27 - June 05
95		June 06 - June 15
96		June 14 - June 23
97		July 18 - July 27
98		July 25 - Aug. 03
99		Aug. 02 - Aug. 11
100		Aug. 12 - Aug. 21
101		Aug. 22 - Aug. 31
102		Sept. 01 - Sept. 10
103		Oct. 29 - Nov. 04
104		Nov. 24 - Nov. 29
105	1970	Oct. 31-Nov. 02; Dec. 05-07
106	1971	Jan. 13-15; July 24-26


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0600±0003
SATURATION
SATURATION
SC
SC
25
26
27
28
29
30
31
1
2
MAY
1967
JUNE


.5 – 1.1 MeV ELECTRONS
.9 – 1.5 MeV PROTONS
6 – 19 MeV PROTONS
19 – 80 MeV PROTONS
0629±0003
0603±0006
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
3
4
5
6
7
8
9
10
11
12
JUNE 1967


$ .5 - 1.1 MeV ELECTRONS X .9 - 1.5 MeV PROTONS ϕ 6 - 19 MeV PROTONS X 19 - 80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
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10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1300 ± 0300
11
12
13
14
15
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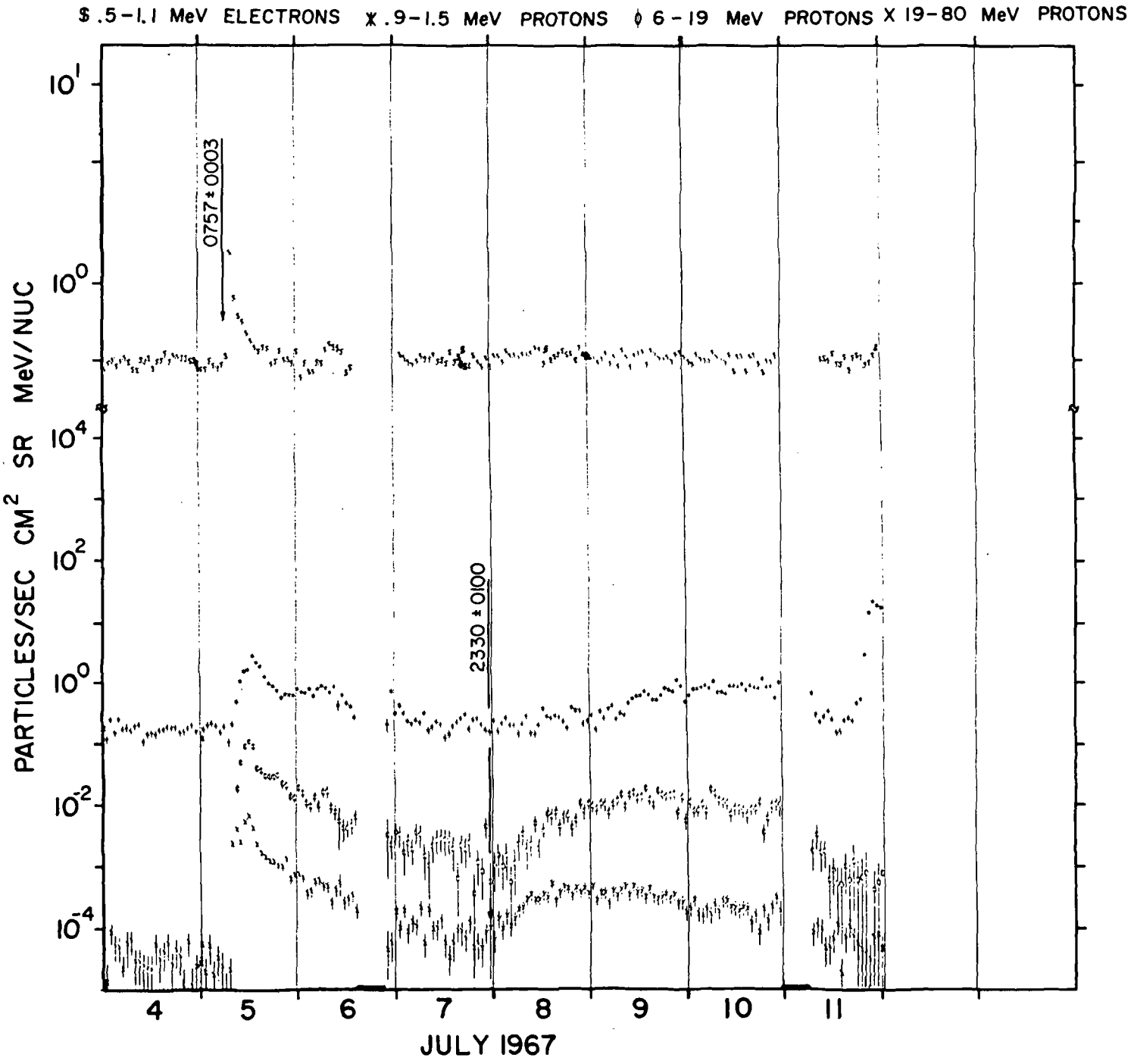
19
20
JUNE 1967


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
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2330 ± 0100
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5
6
7
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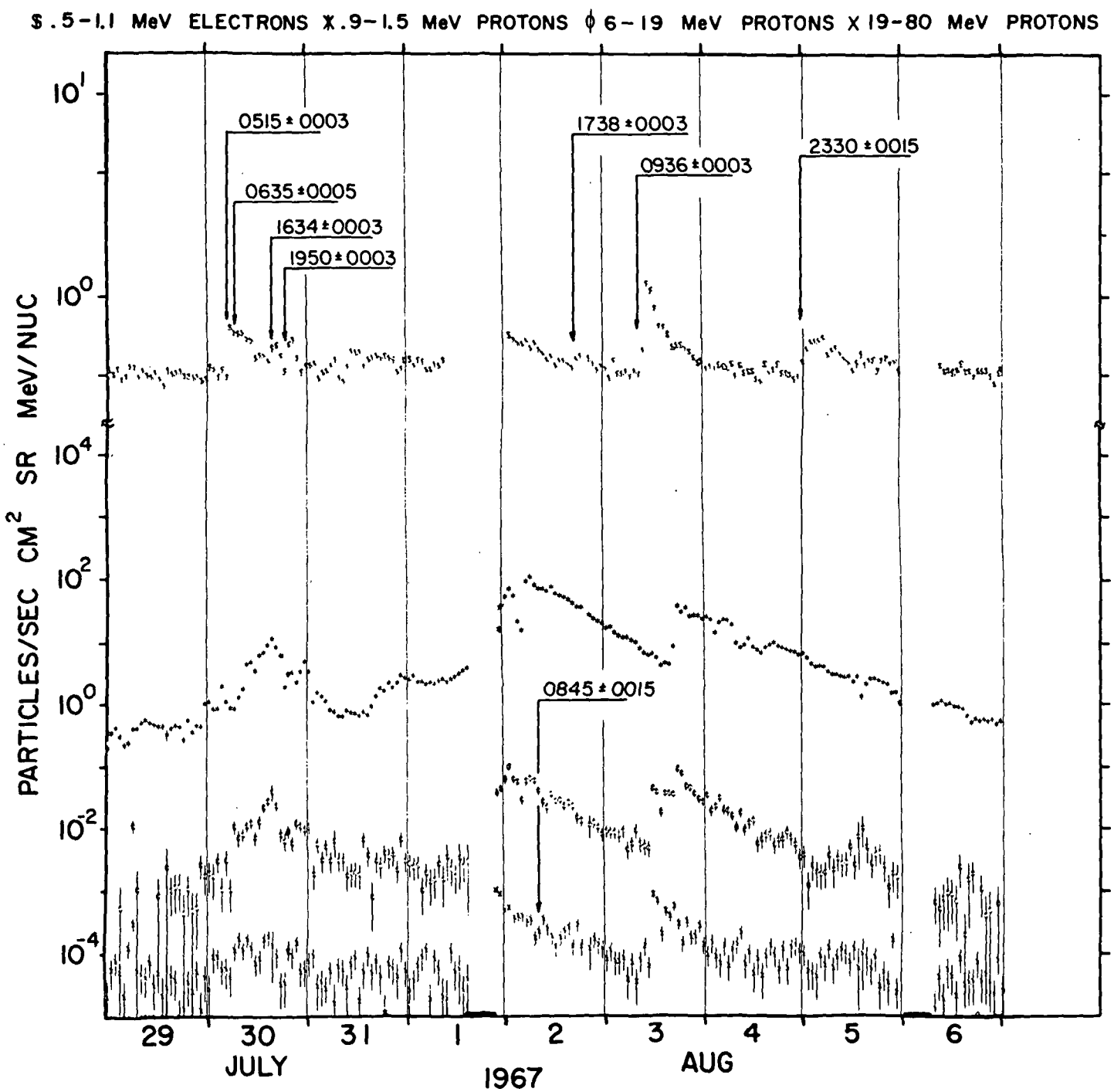
9
10
11
JULY 1967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PARTICLES/SEC CM² SR MeV/NUC
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10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0515±0003
0635±0005
1634±0003
1950±0003
1738±0003
0936±0003
2330±0015
0845±0015
29
30
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1
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6
JULY
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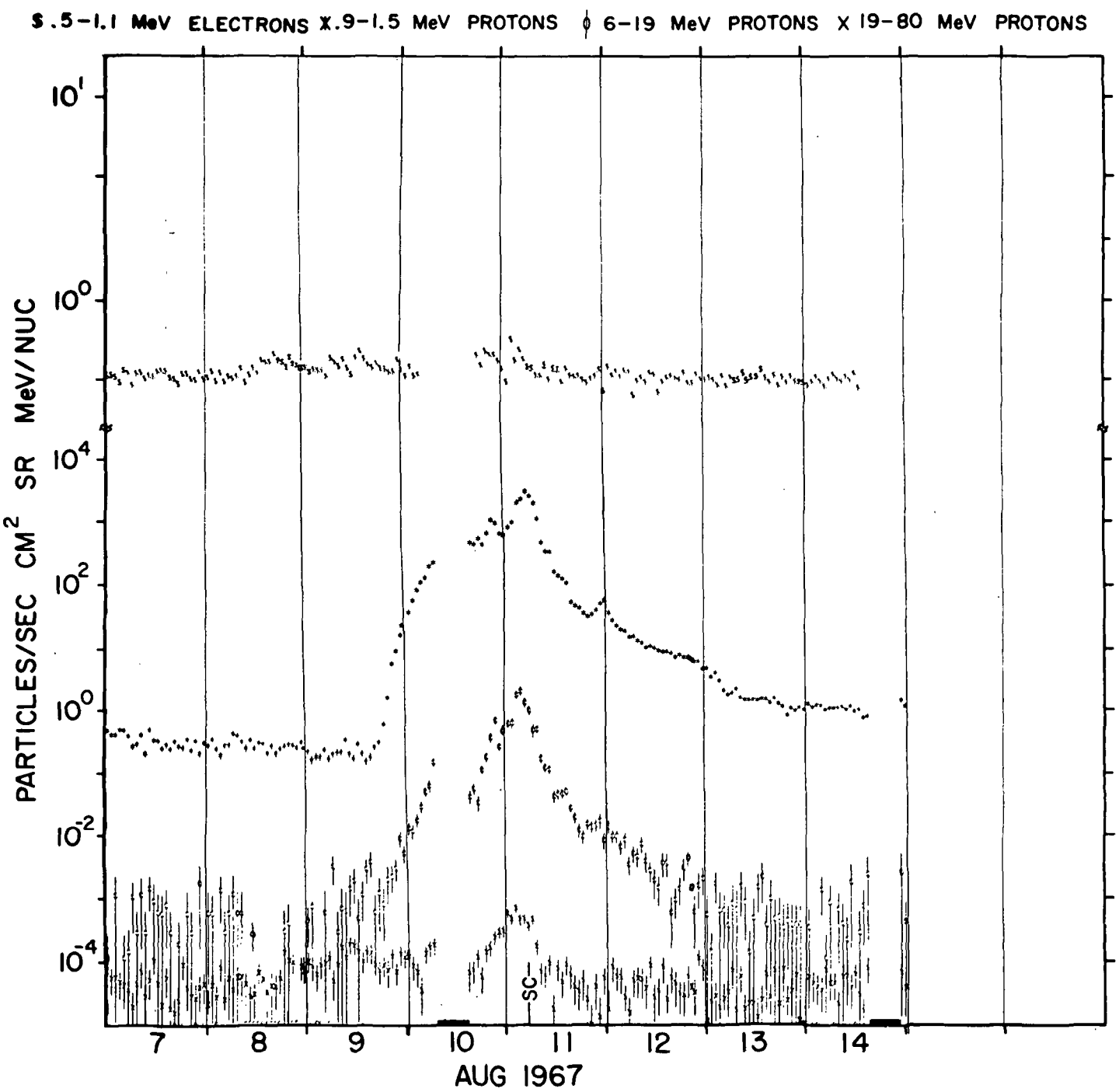
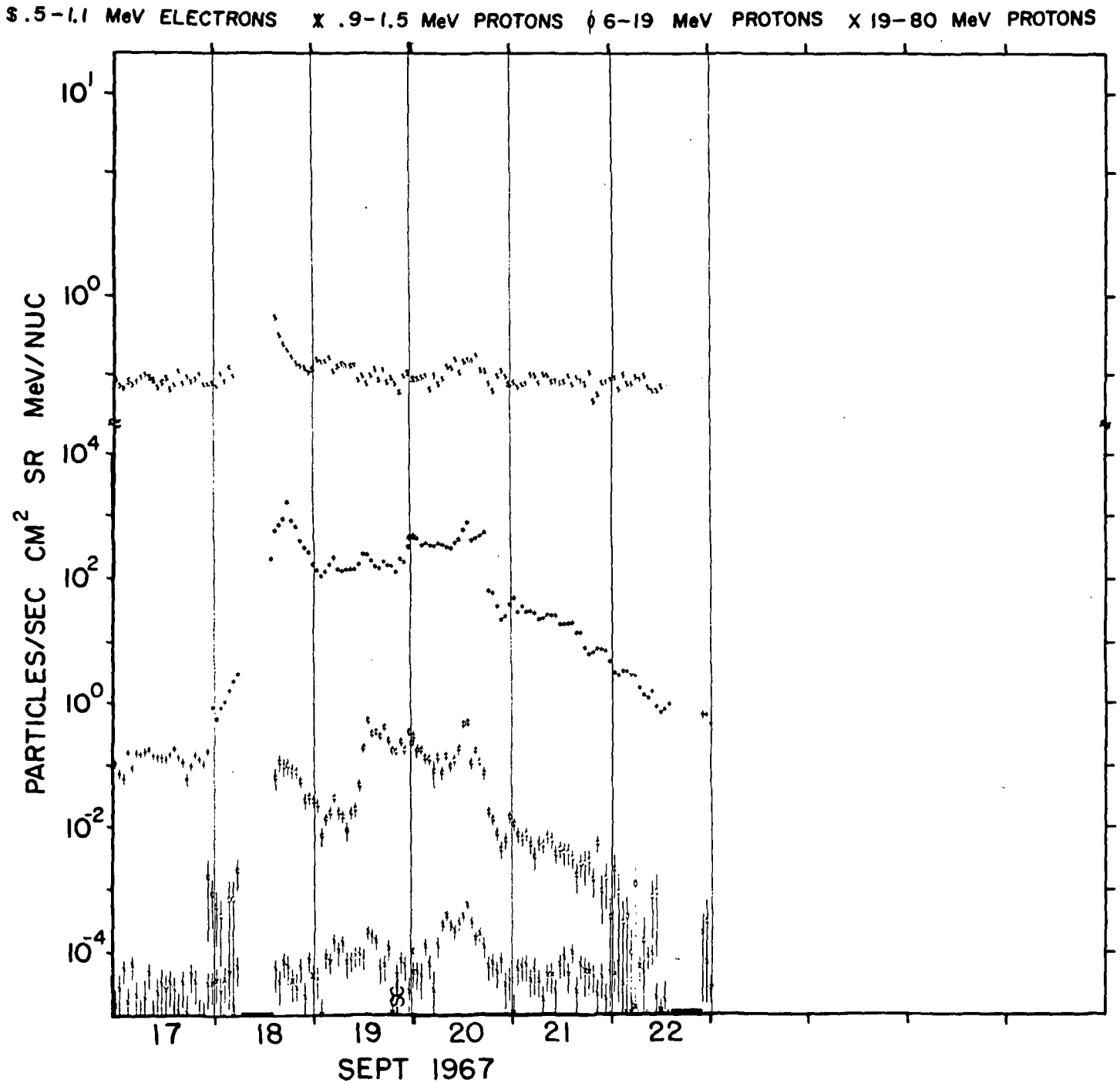

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
7
8
9
10
11
12
13
14
AUG 1967


$ .5-1.1 MeV ELECTRONS
x .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
17
18
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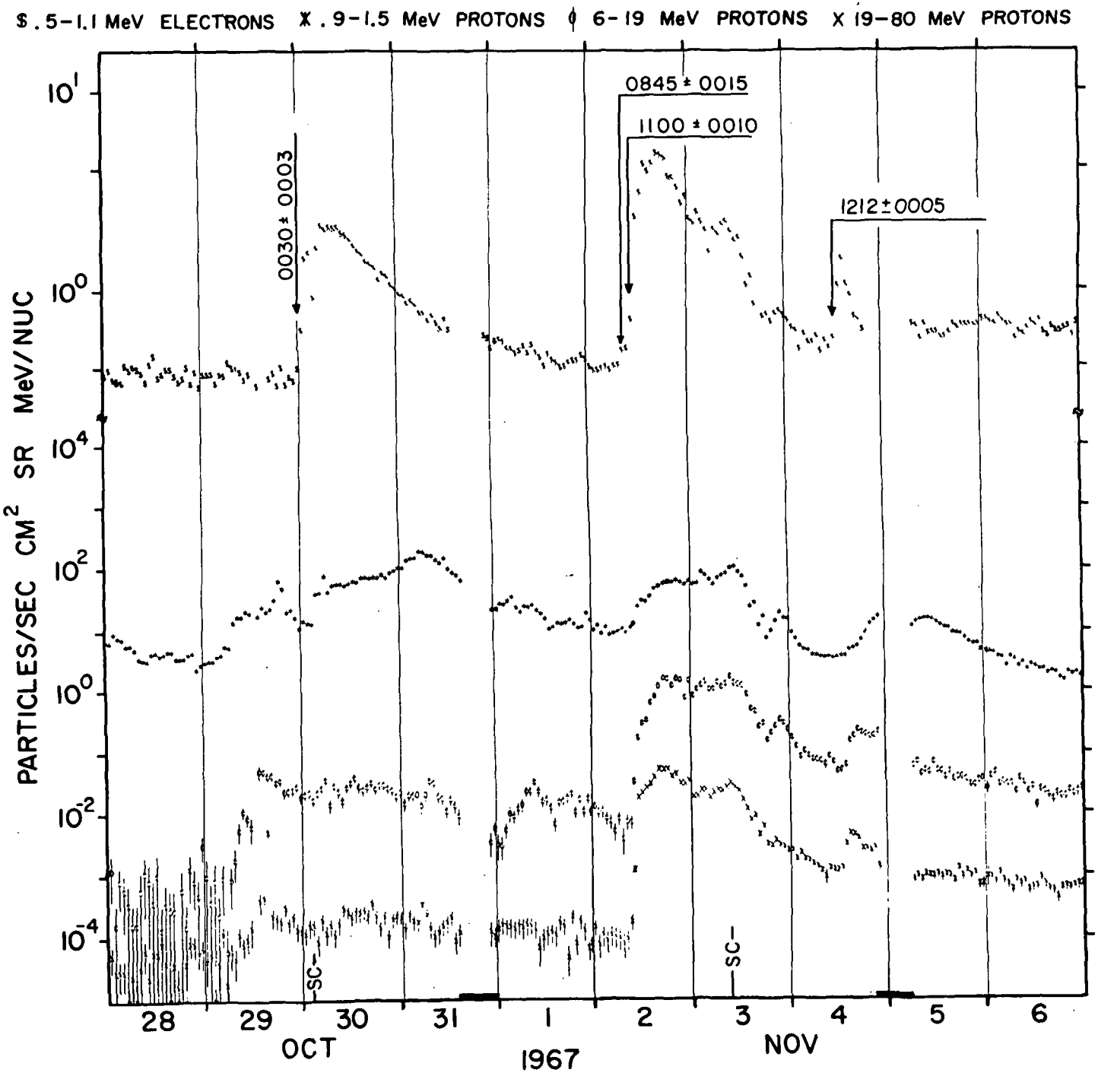
22
SEPT 1967


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0030 ± 0003
0845 ± 0015
1100 ± 0010
1212 ± 0005
SC
SC
28
29
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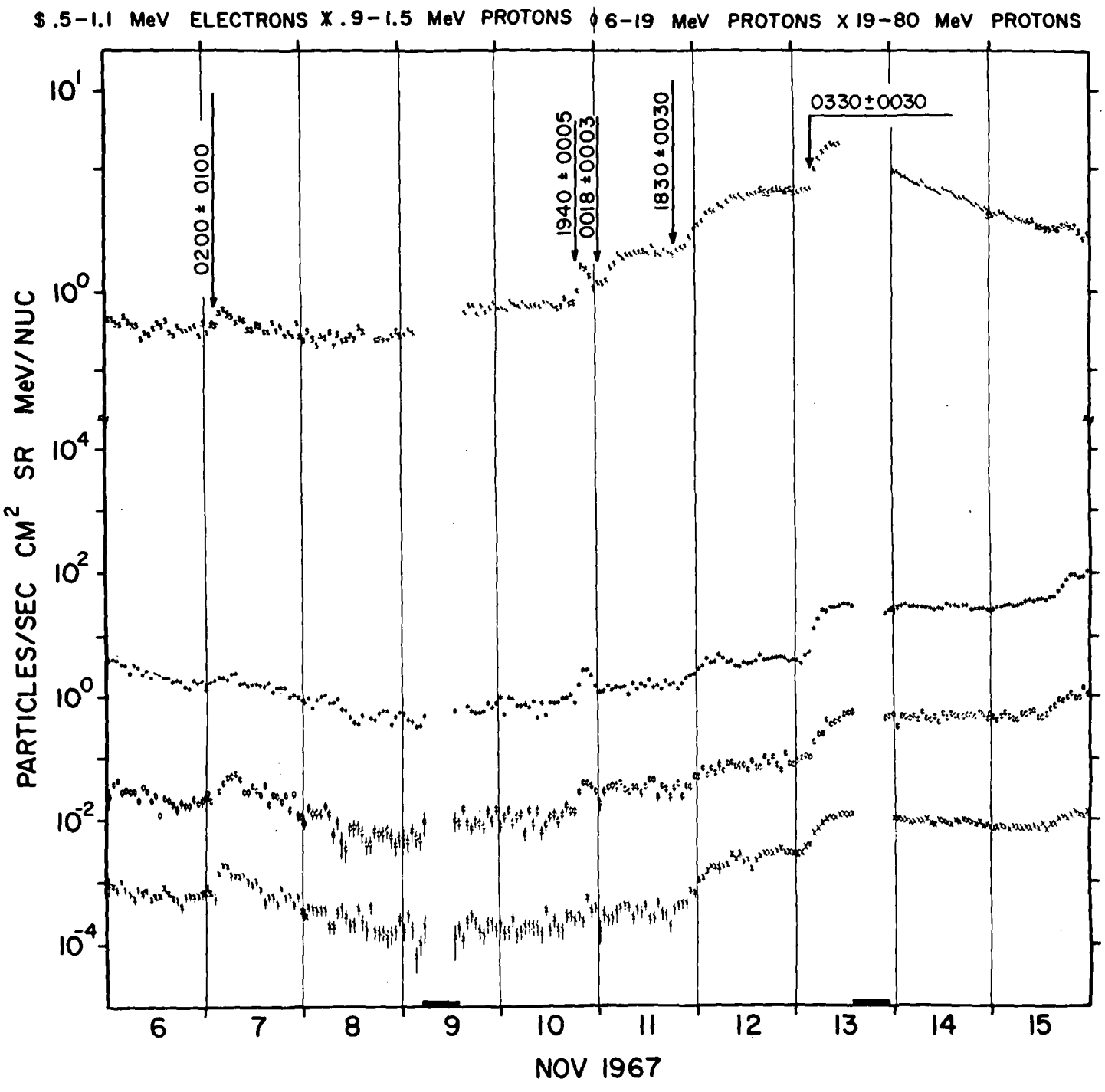
OCT
1967
NOV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PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0200 ± 0100
1940 ± 0005
0018 ± 0003
1830 ± 0030
0330 ± 0030
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9
10
11
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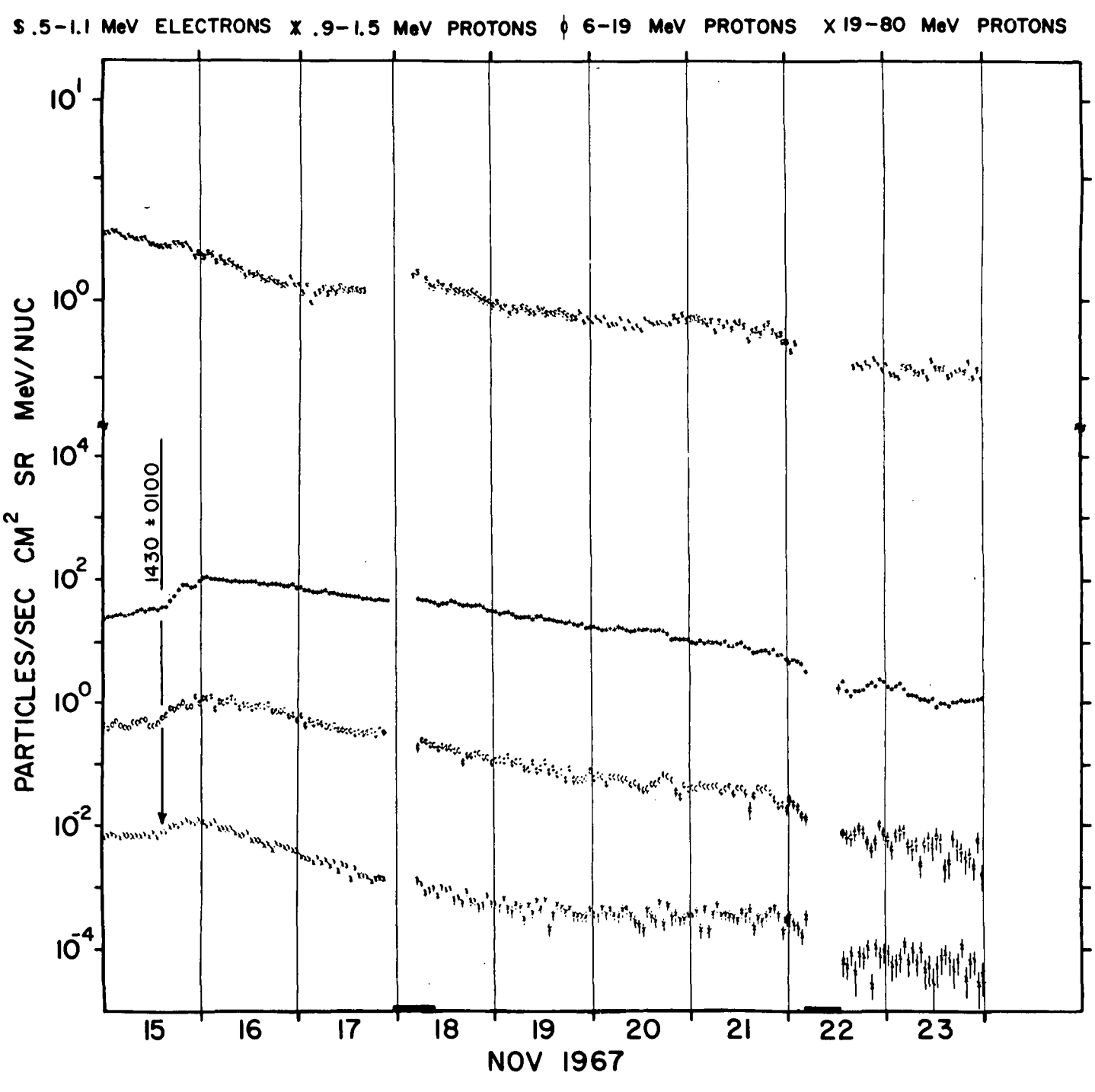
14
15
NOV 1967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PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1430 ± 0100
15
16
17
18
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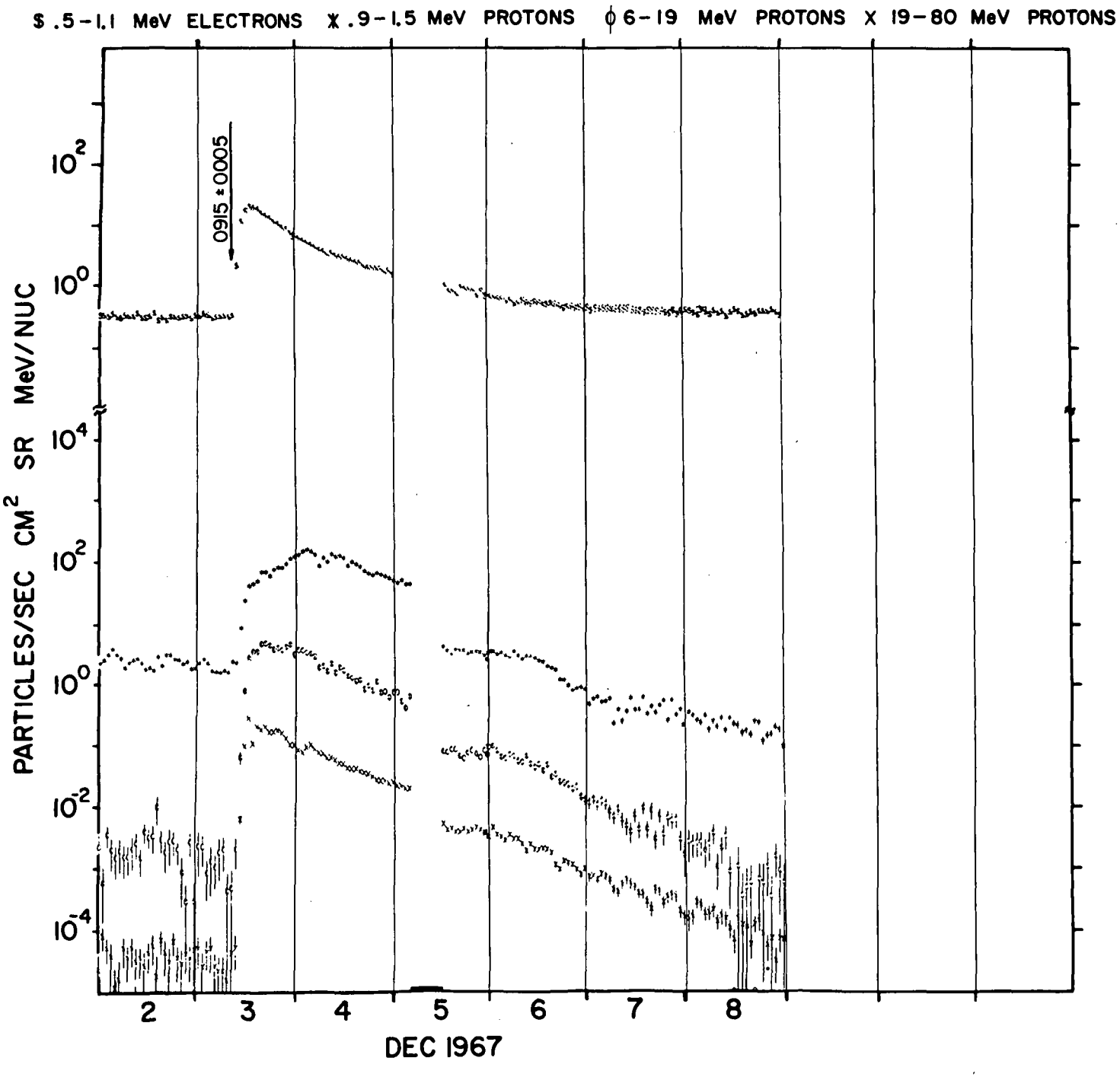
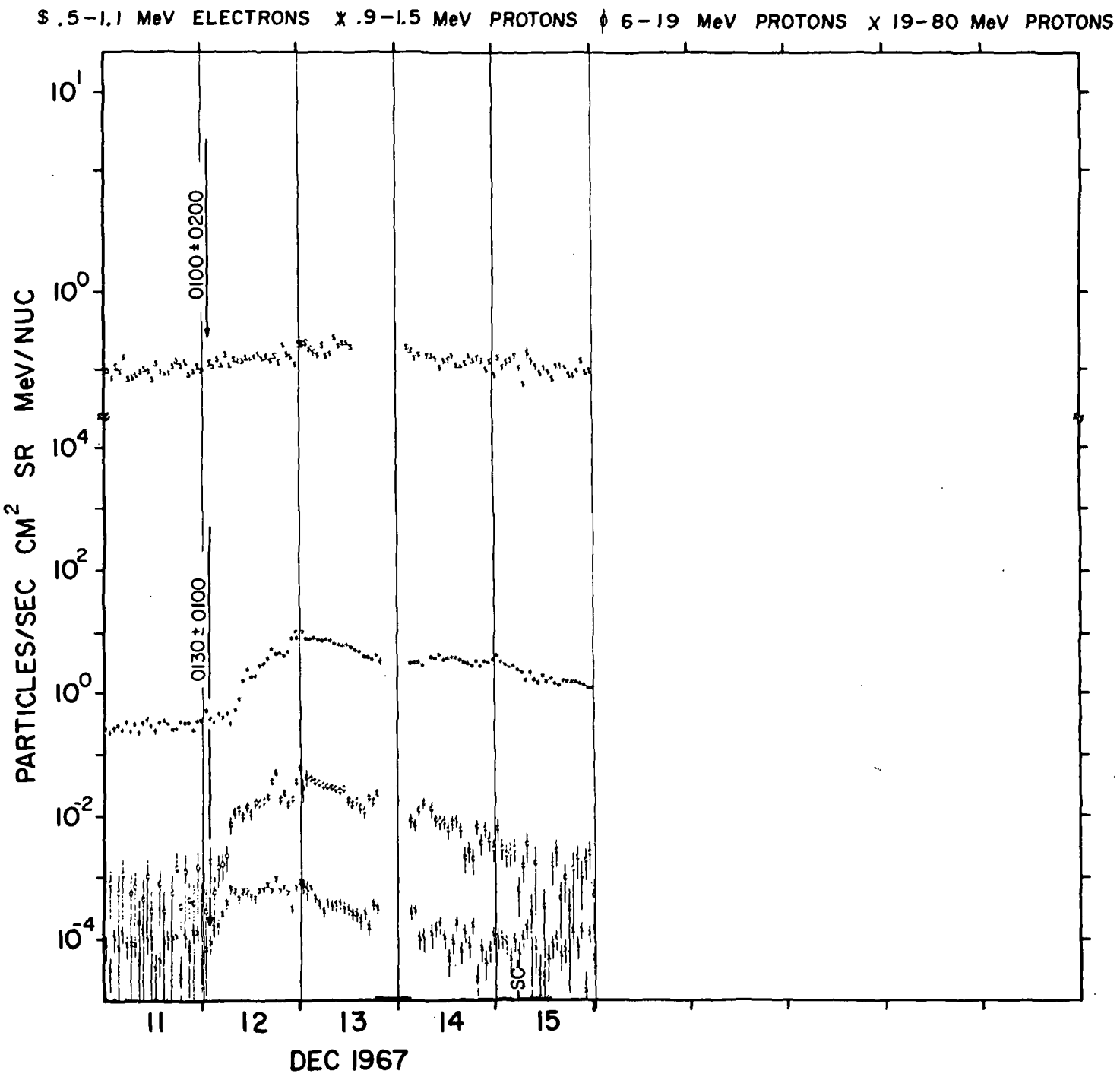
22
23
NOV 1967


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
0915 ± 0005
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2
3
4
5
6
7
8
DEC 1967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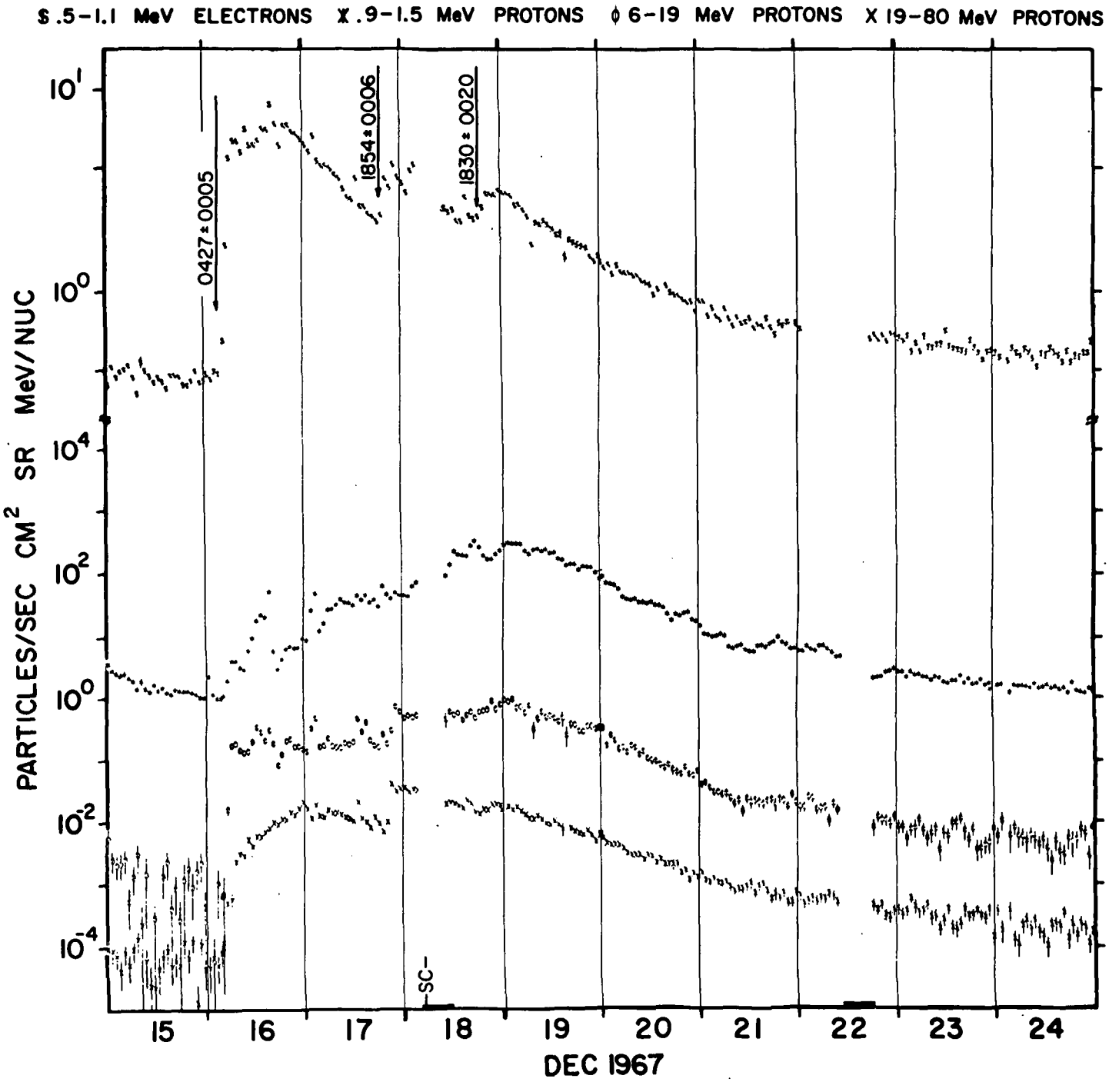
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0100 ± 0200
0130 ± 0100
SC
11
12
13
14
15
DEC 1967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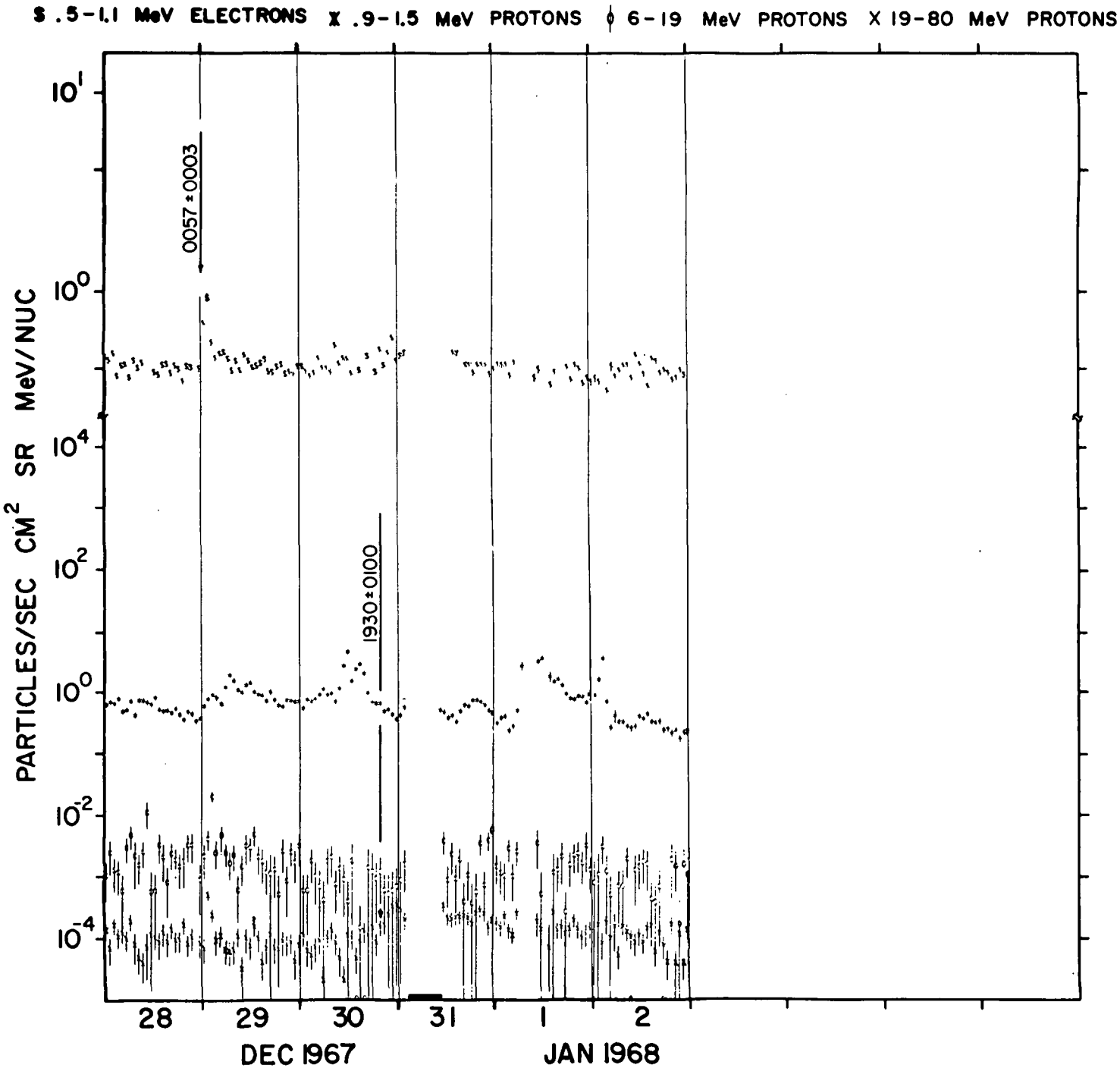
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0427±0005
1854±0006
1830±0020
SC-
15
16
17
18
19
20
21
22
23
24
DEC 1967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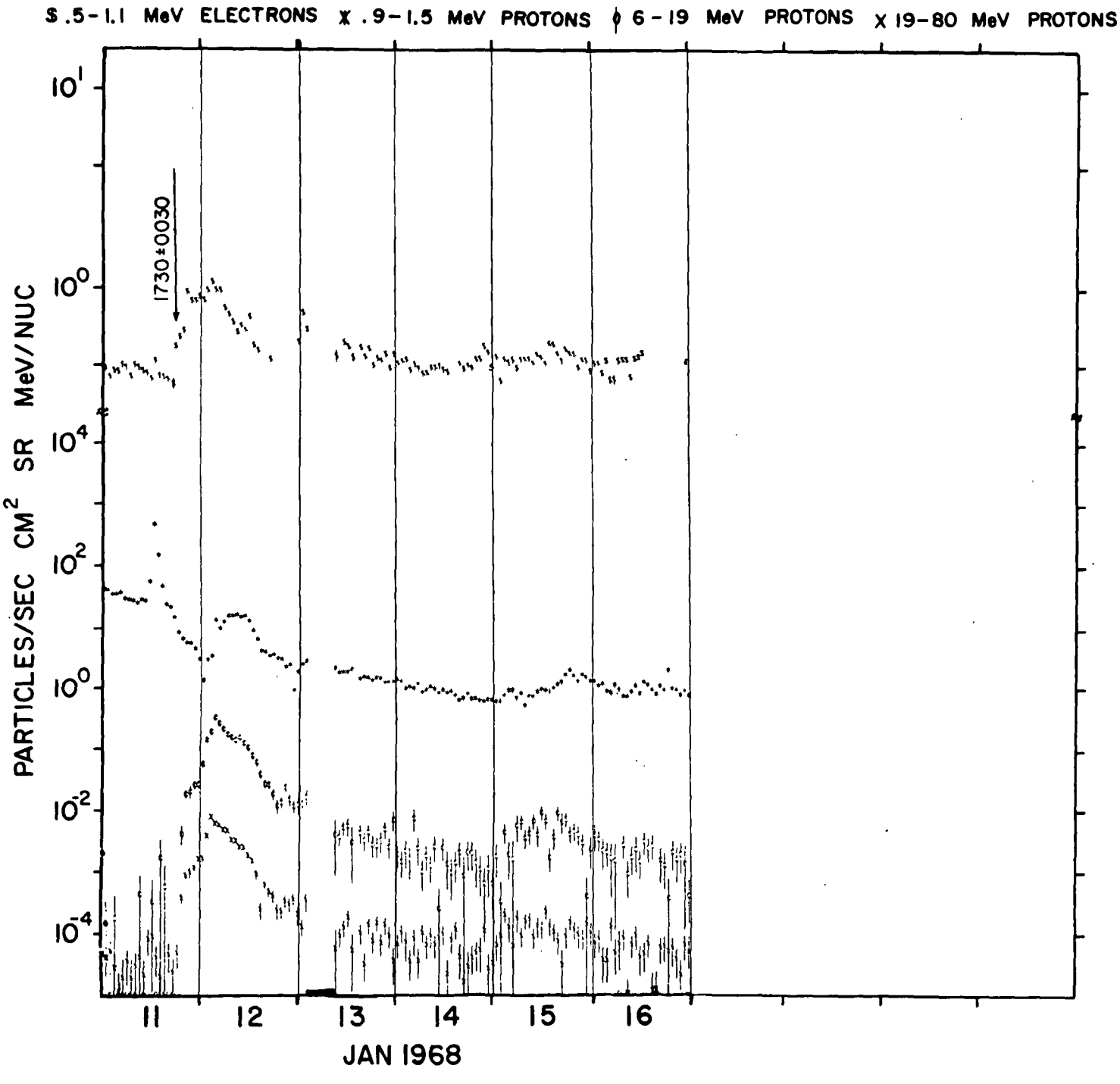
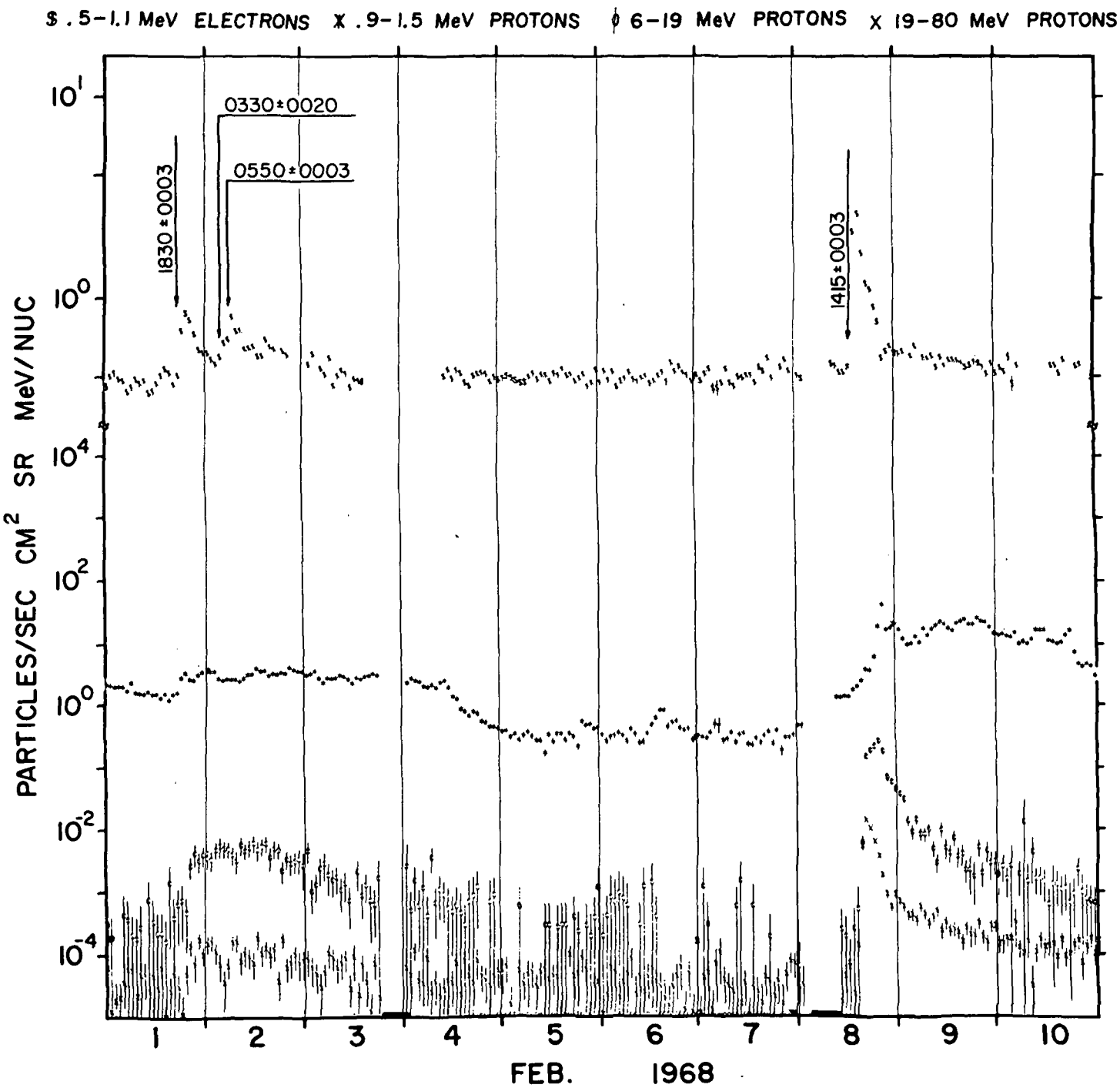
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0057±0003
1930±0100
28
29
30
31
1
2
DEC 1967
JAN 1968


S .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁻²
10⁻⁴
10⁴
10²
10⁰
1730±0030
11
12
13
14
15
16
JAN 1968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PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0330±0020
0550±0003
1830±0003
1415±0003
1
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3
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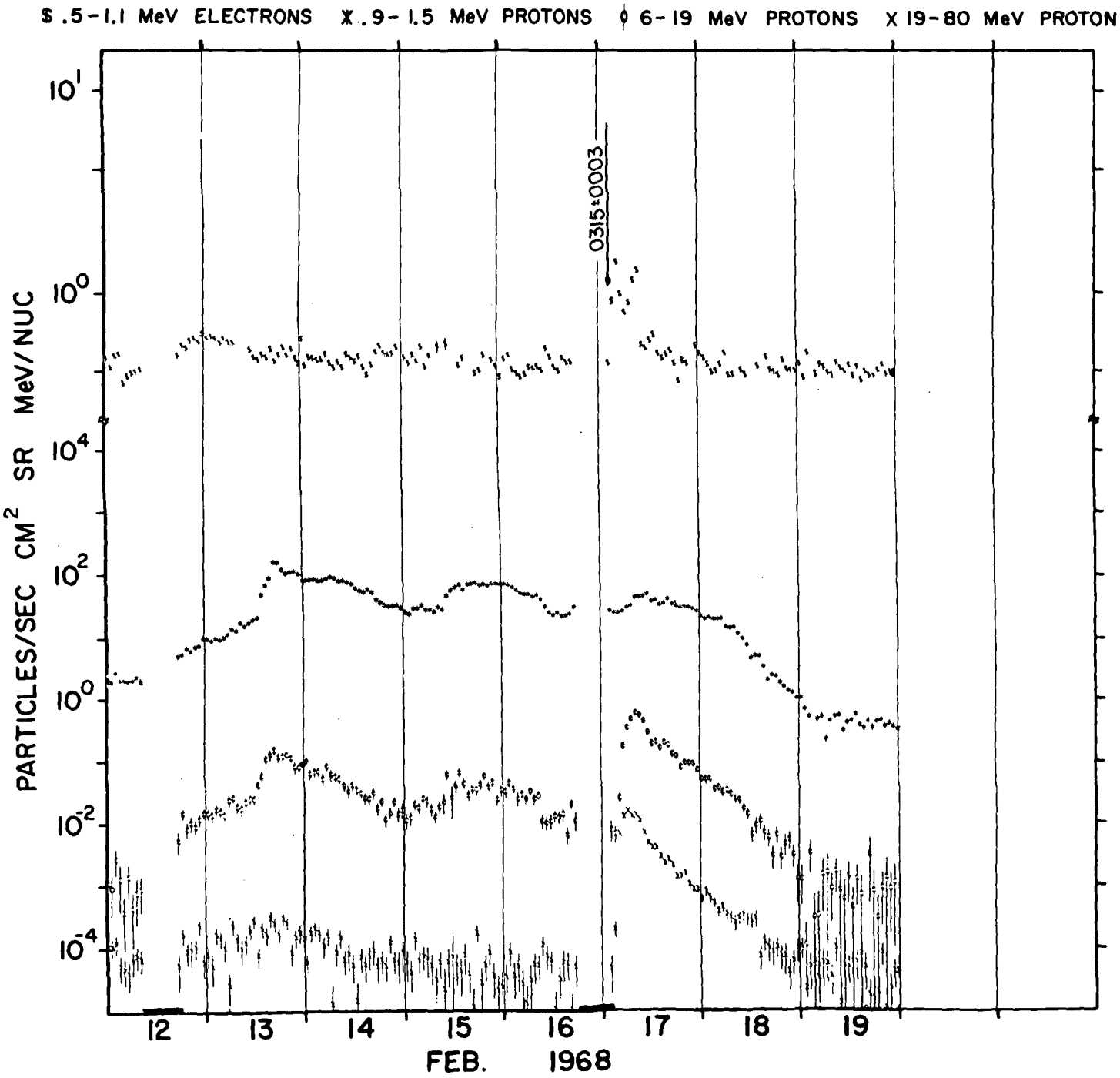
5
6
7
8
9
10
FEB. 1968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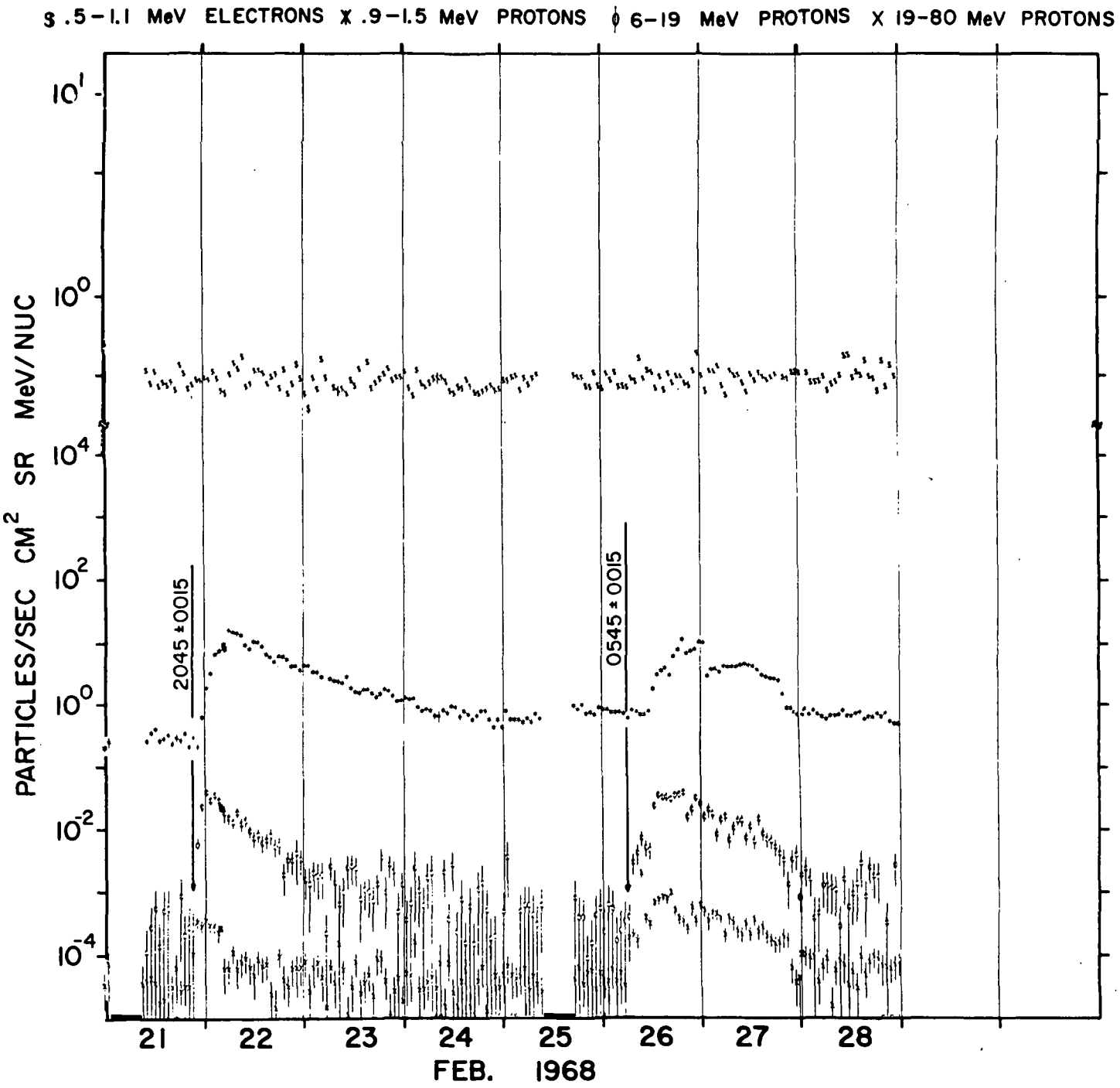
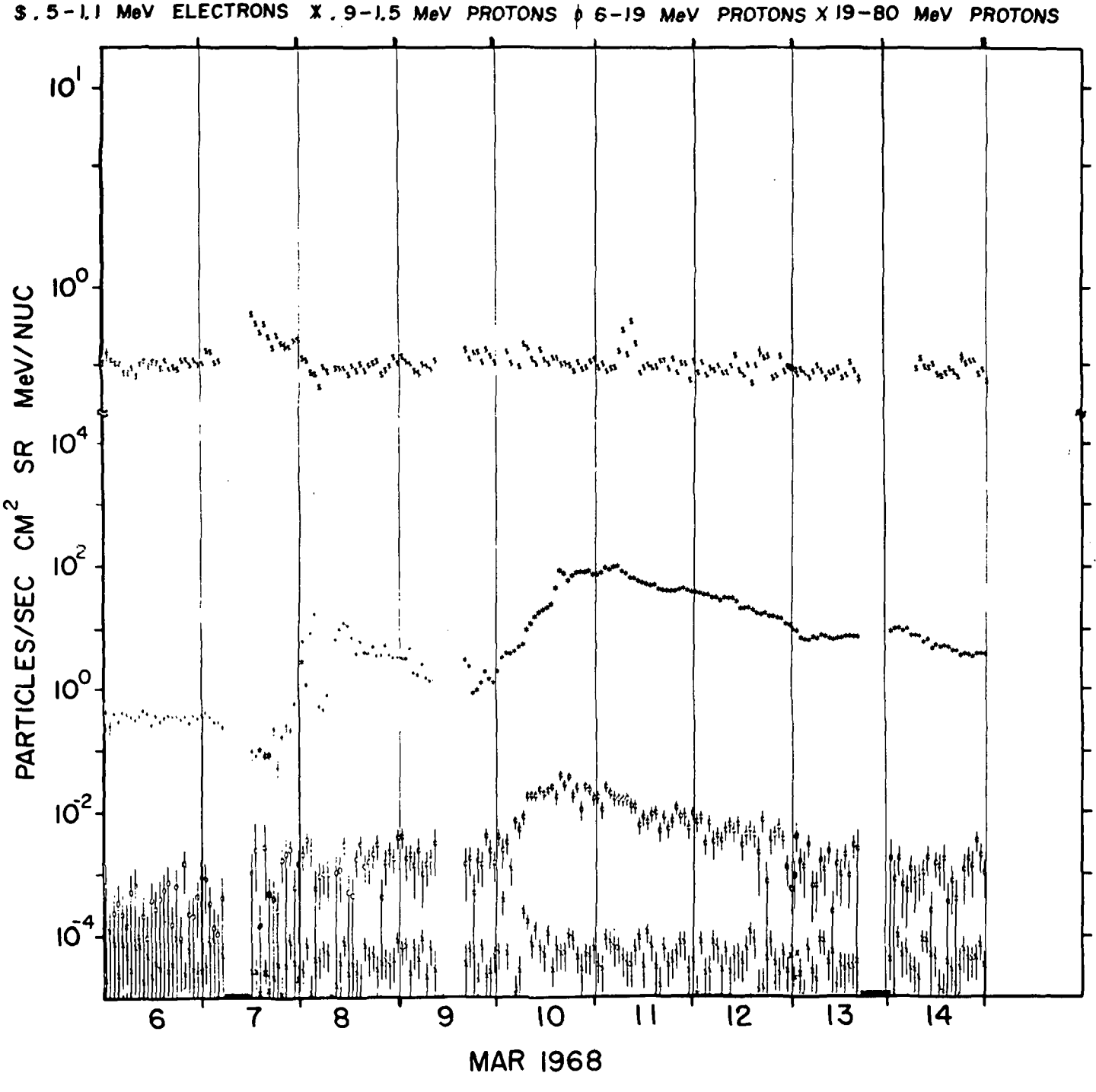
X .9-1.5 MeV PROTONS
φ 6-19 MeV PROTONS
X 19-80 MeV PROTON
0315±0003
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
12
13
14
15
16
17
18
19
FEB.
1968


S .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2045 ±0015
0545 ±0015
21
22
23
24
25
26
27
28
FEB. 1968


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
6
7
8
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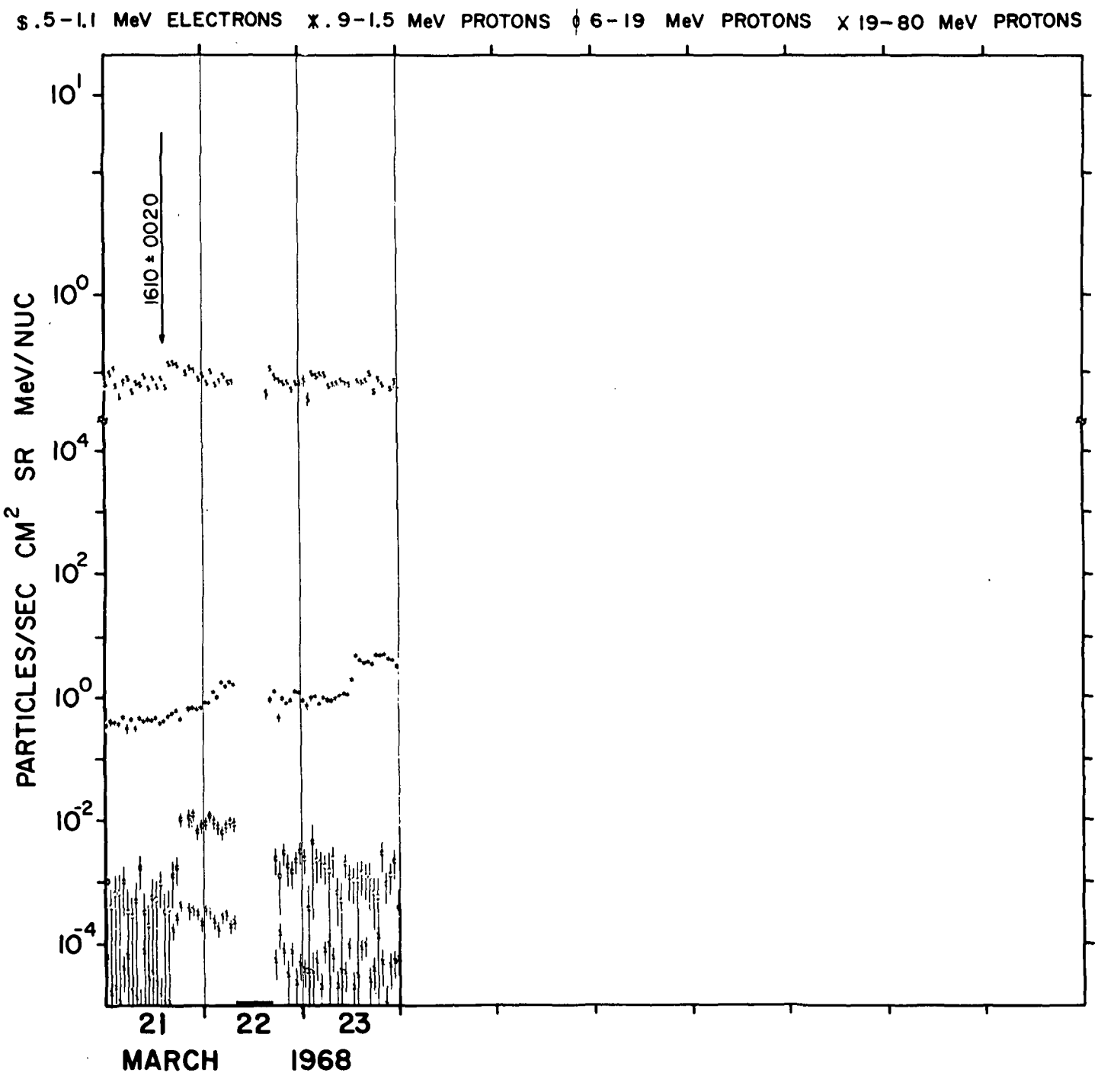
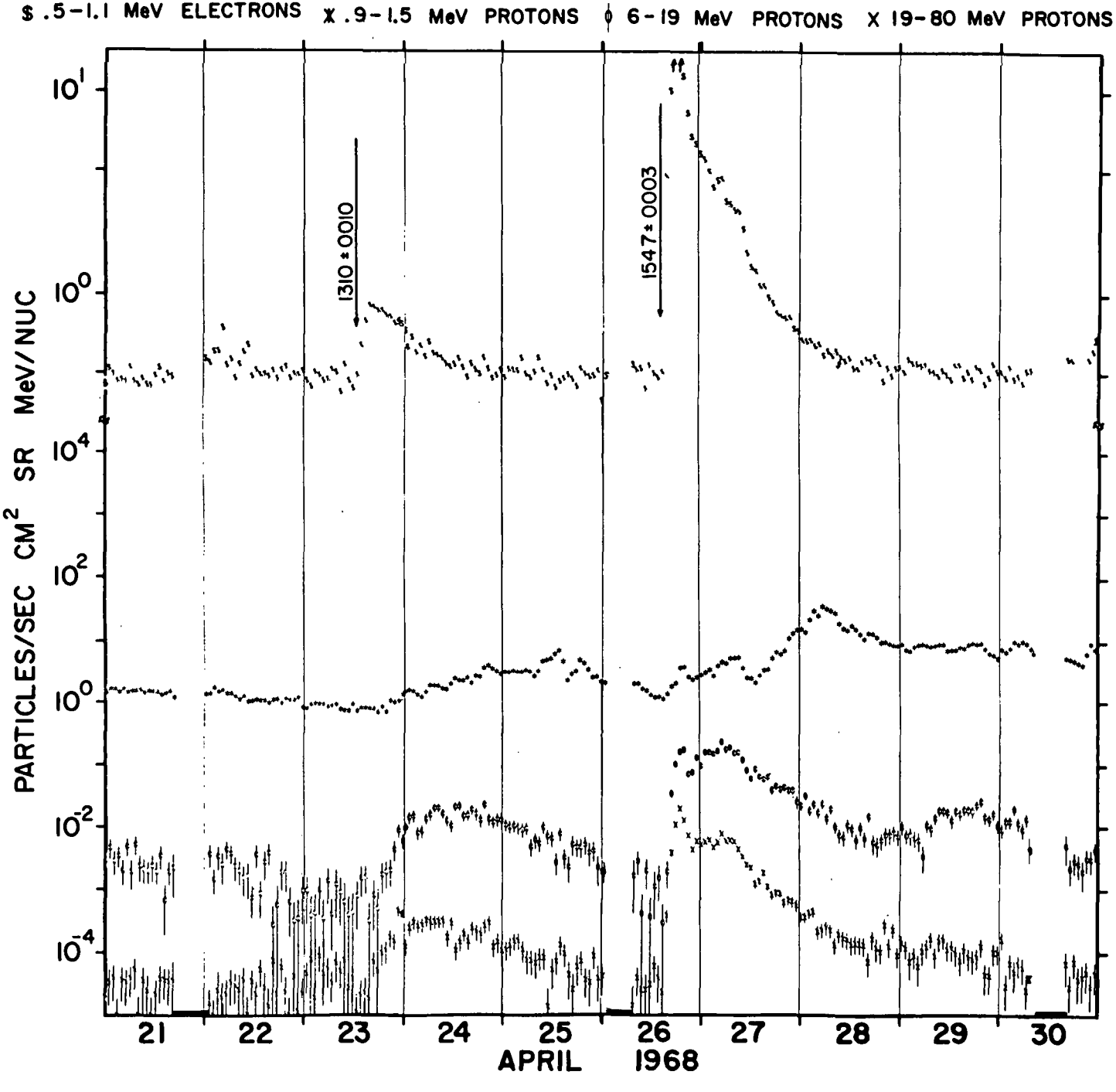
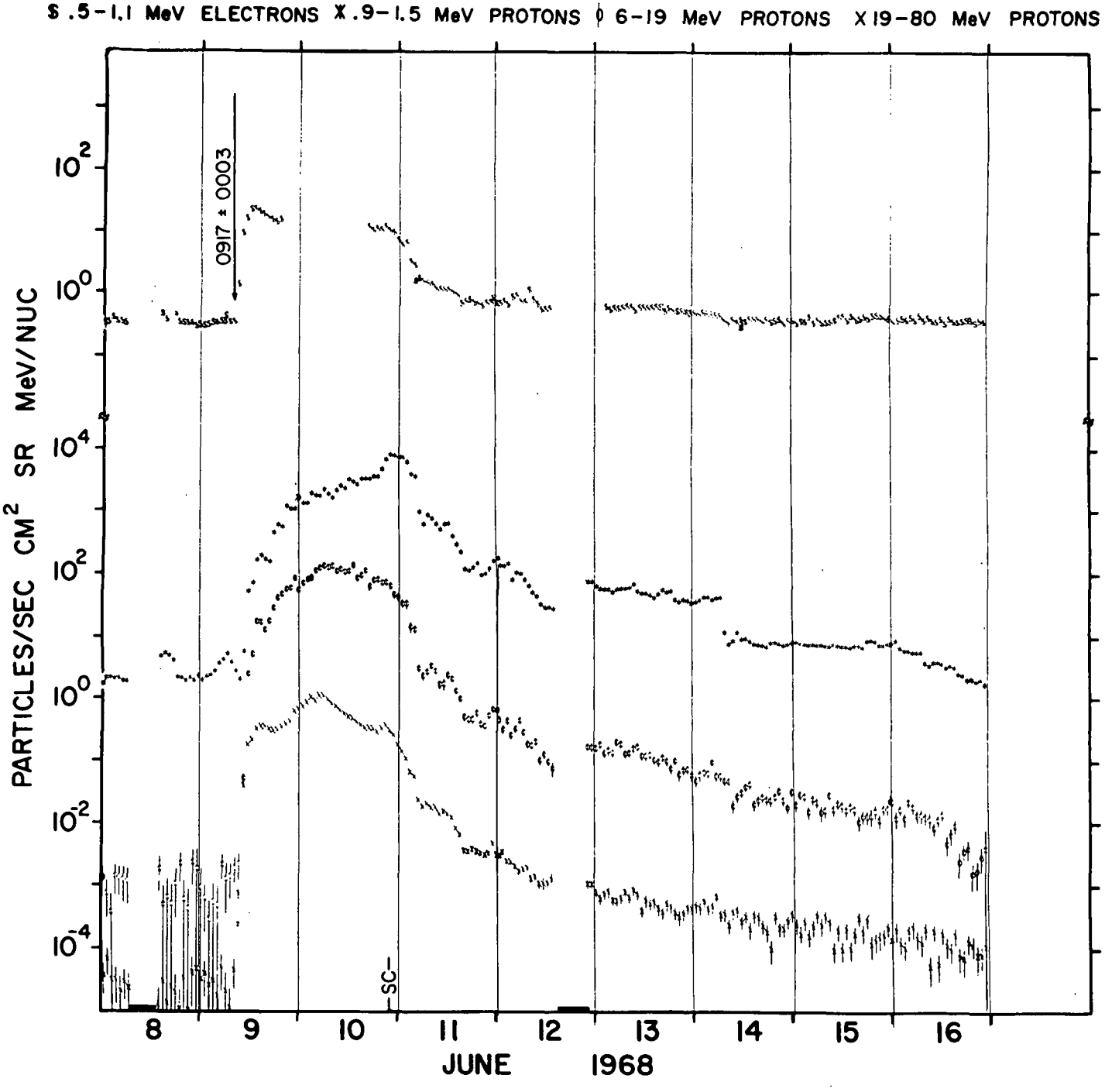
10
11
12
13
14
MAR 1968


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁻¹
10⁻²
10⁻³
10⁻⁴
1610 ± 0020
21
22
23
MARCH
1968


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1310±0010
1547±0003
21
22
23
24
25
26
27
28
29
30
APRIL 1968


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0917 ± 0003
SC
8
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10
11
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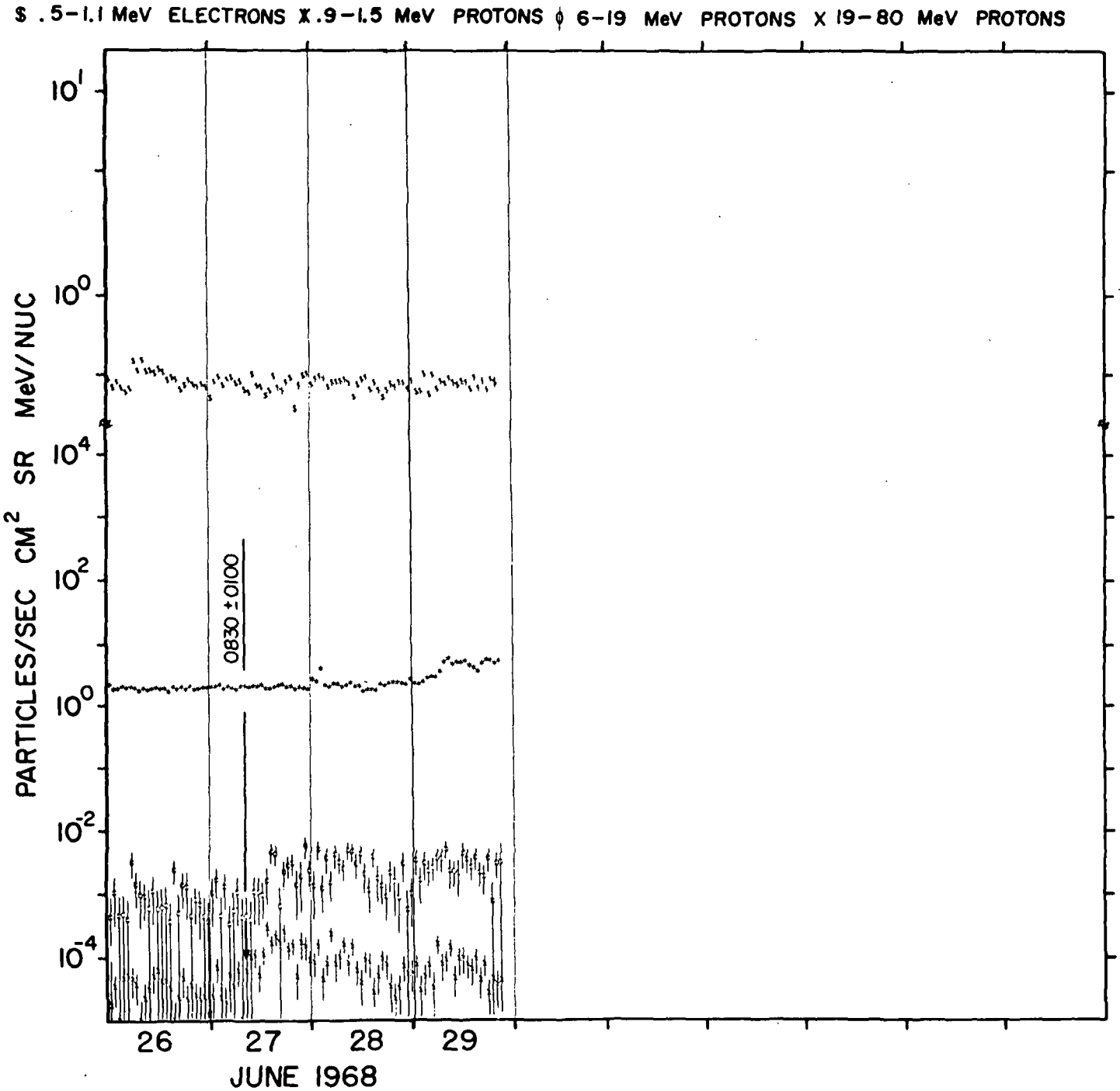
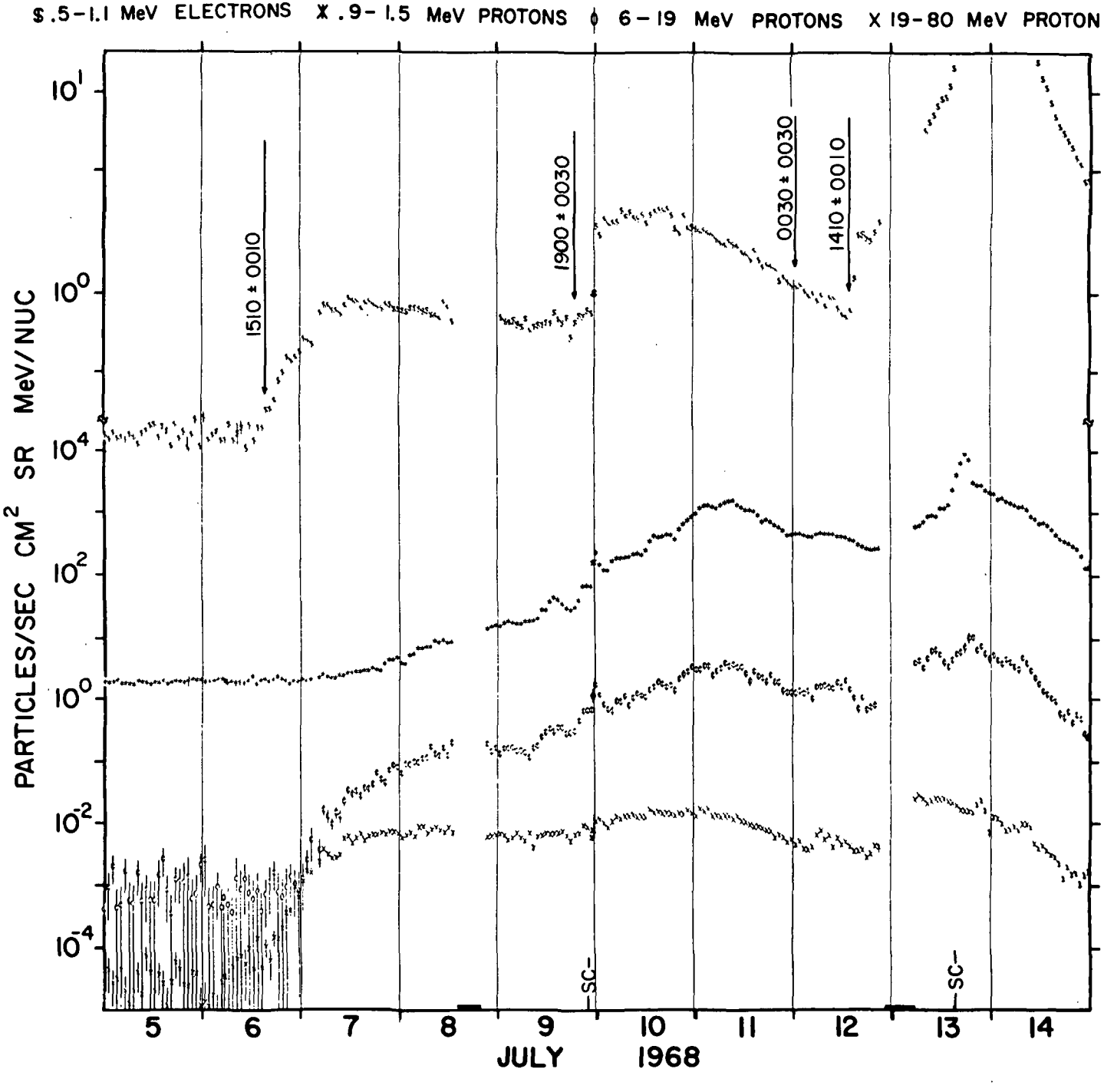
15
16
JUNE 1968


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0830 ± 0100
26
27
28
29
JUNE 1968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PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1510 ± 0010
1900 ± 0030
0030 ± 0030
1410 ± 0010
SC-
SC-
5
6
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10
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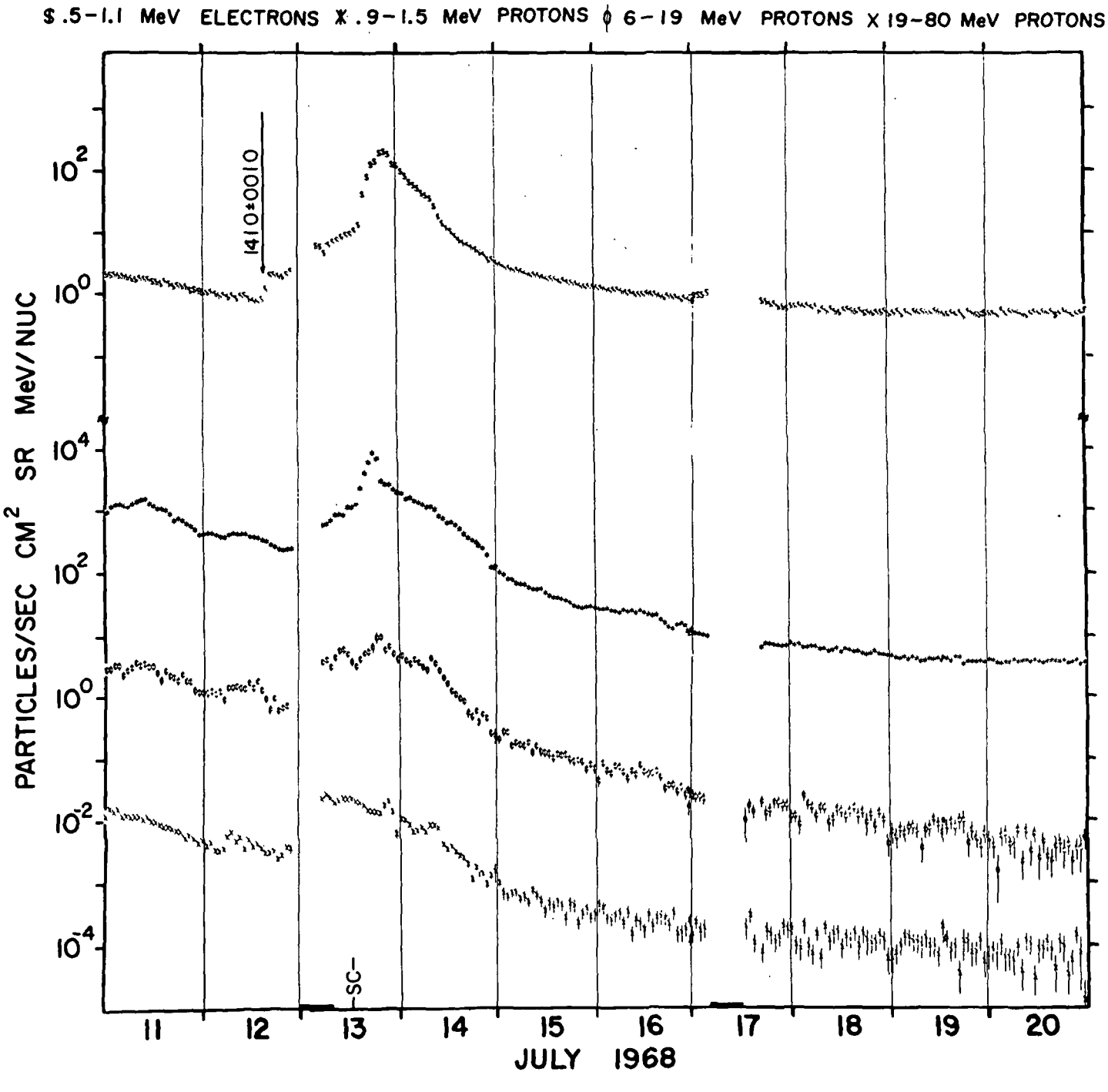
14
JULY
1968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1410±0010
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
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15
16
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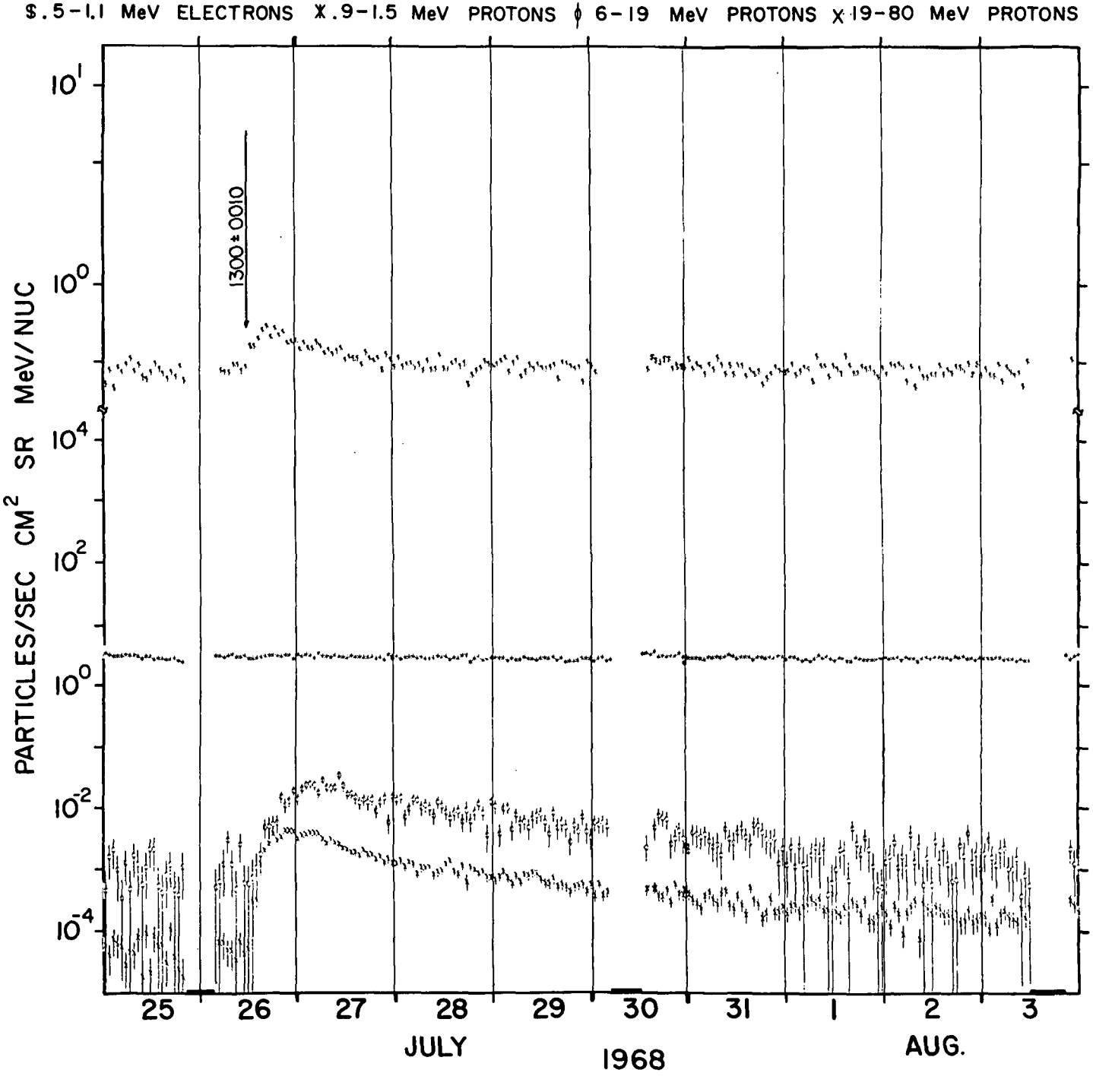
19
20
JULY 1968


$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1300±0010
25
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31
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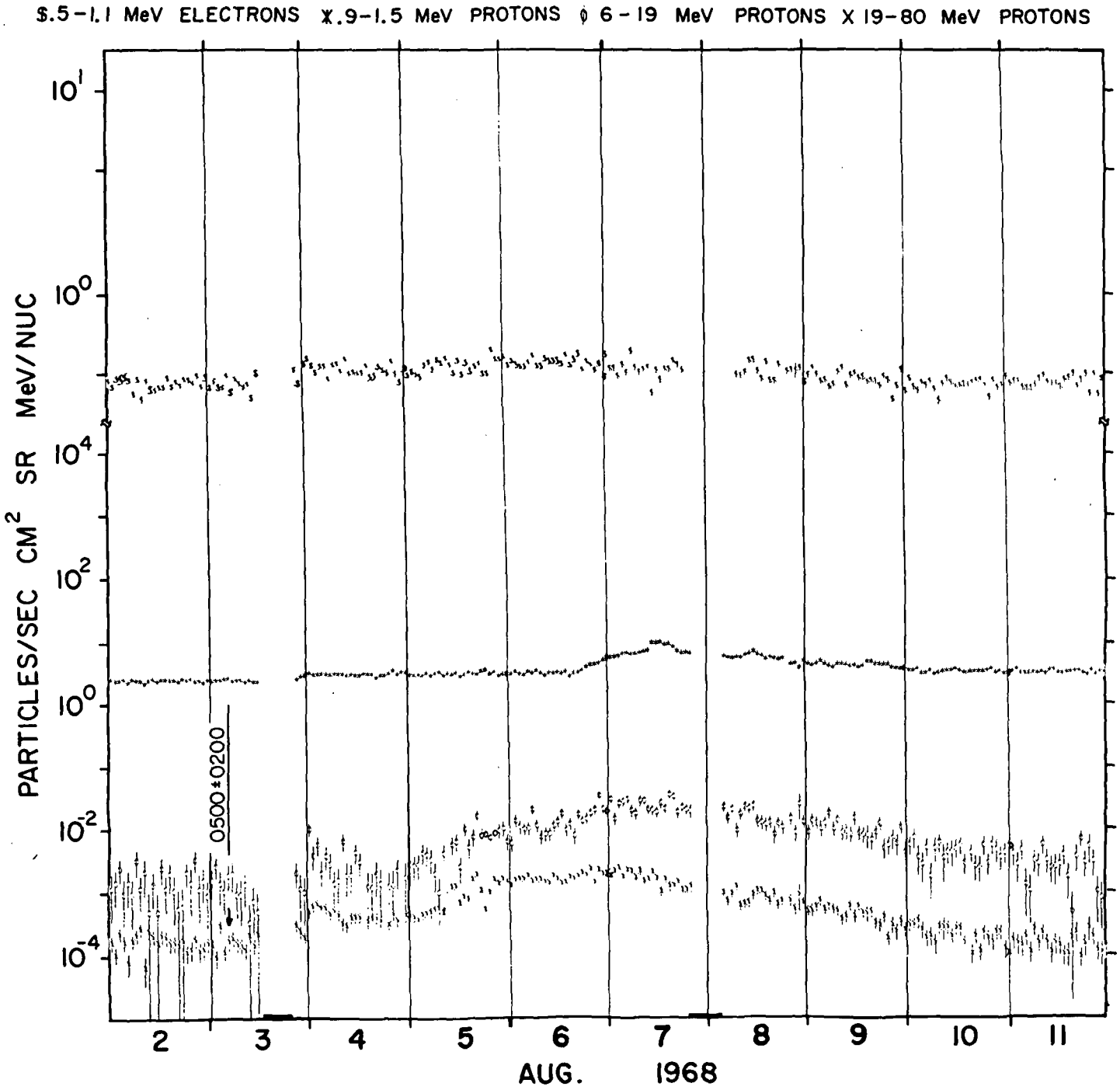
JULY
1968
AUG.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PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0500±0200
2
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4
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6
7
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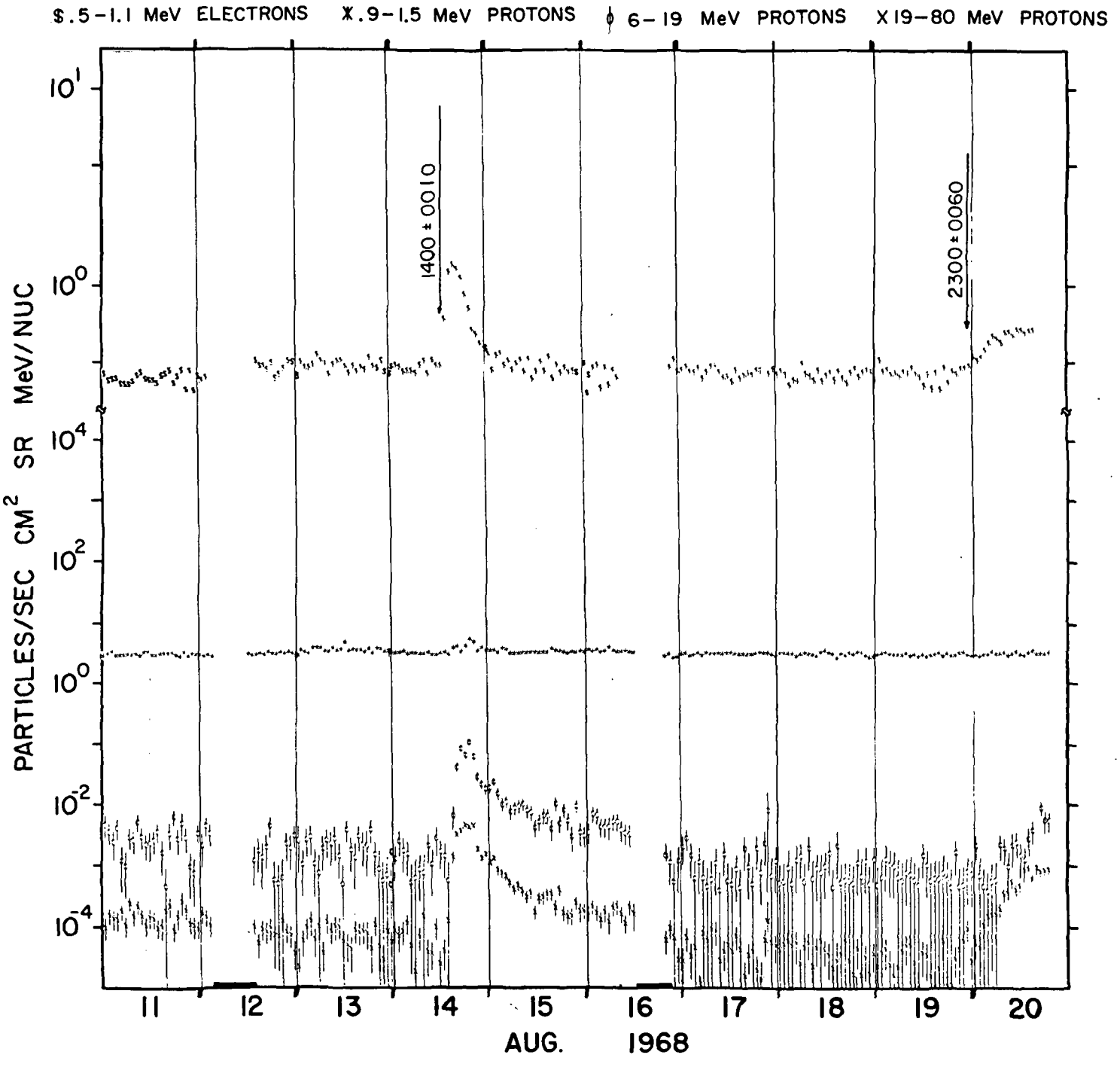
10
11
AUG. 1968


$.5-1.1 MeV ELECTRONS
X.9-1.5 MeV PROTONS
φ 6-19 MeV PROTONS
X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1400±0010
2300±0060
11
12
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15
16
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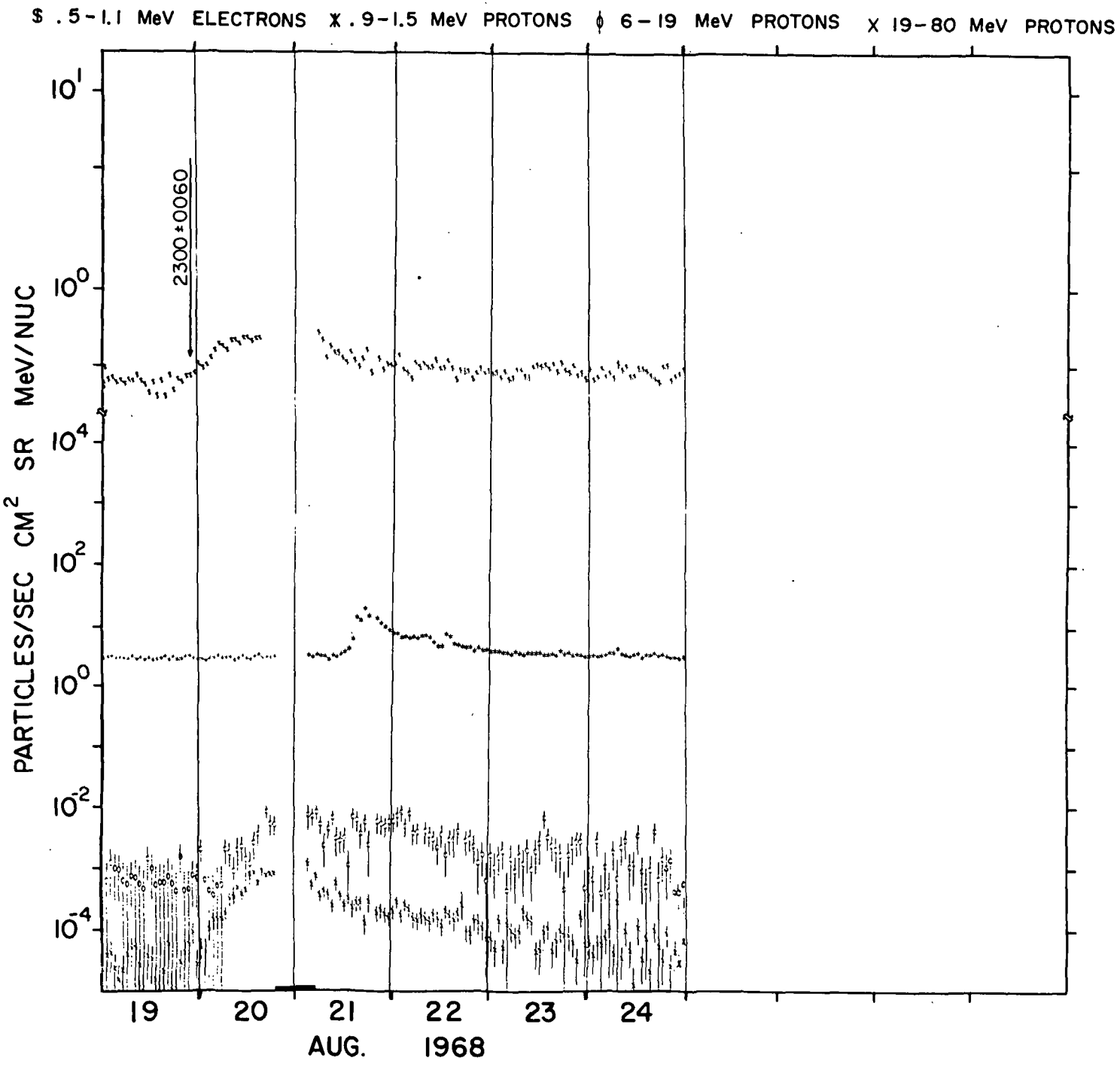
18
19
20
AUG.
1968


$ .5 - 1.1 MeV ELECTRONS X .9 - 1.5 MeV PROTONS ϕ 6 - 19 MeV PROTONS X 19 - 80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2300 ± 0060
19
20
21
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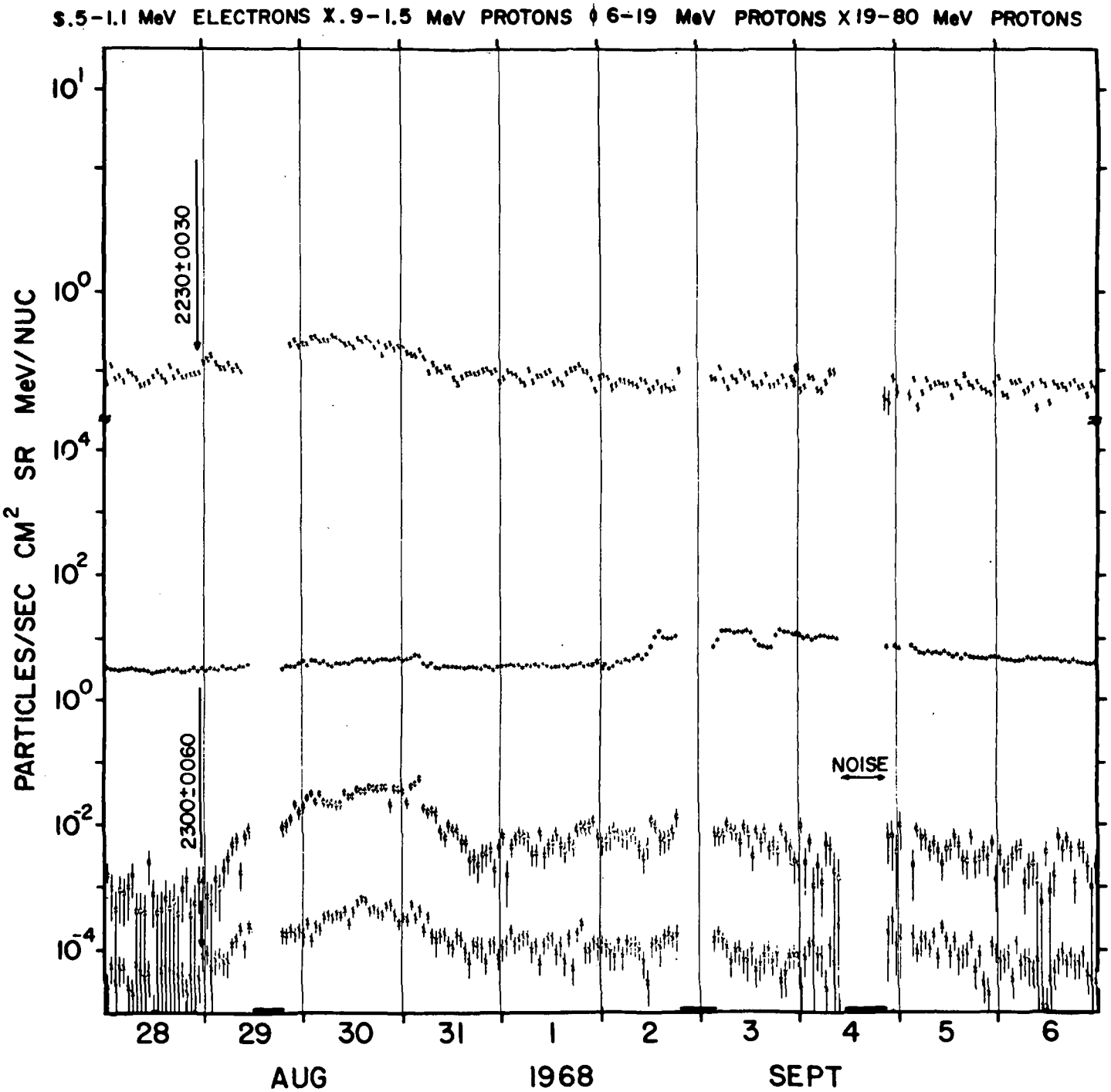
24
AUG.
1968


.5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁻¹
10⁻²
10⁻³
10⁻⁴
2230±0030
2300±0060
NOISE
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31
1
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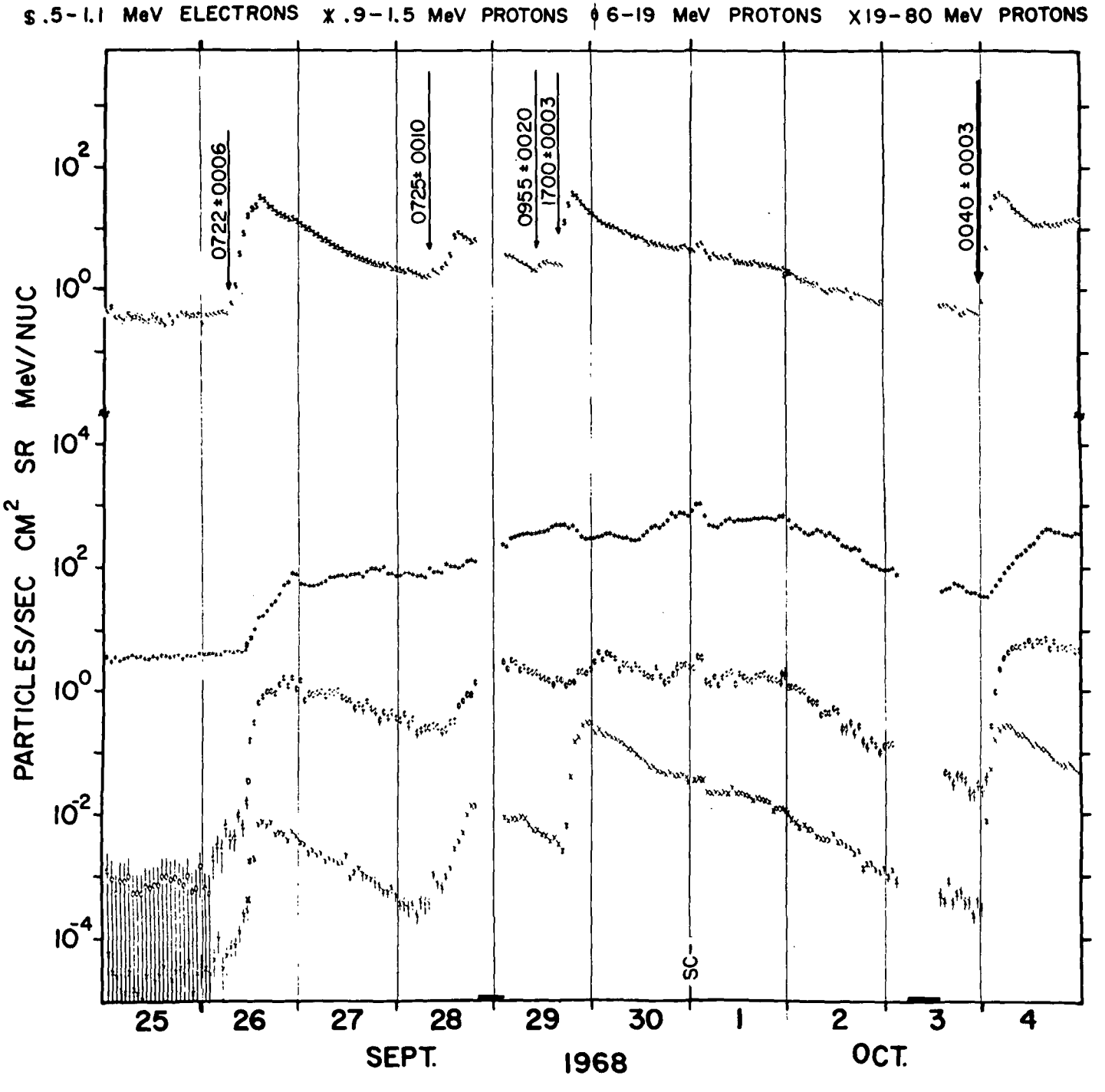
3
4
5
6
AUG
1968
SEPT


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0722±0006
0725±0010
0955±0020
1700±0003
0040±0003
SC-
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30
1
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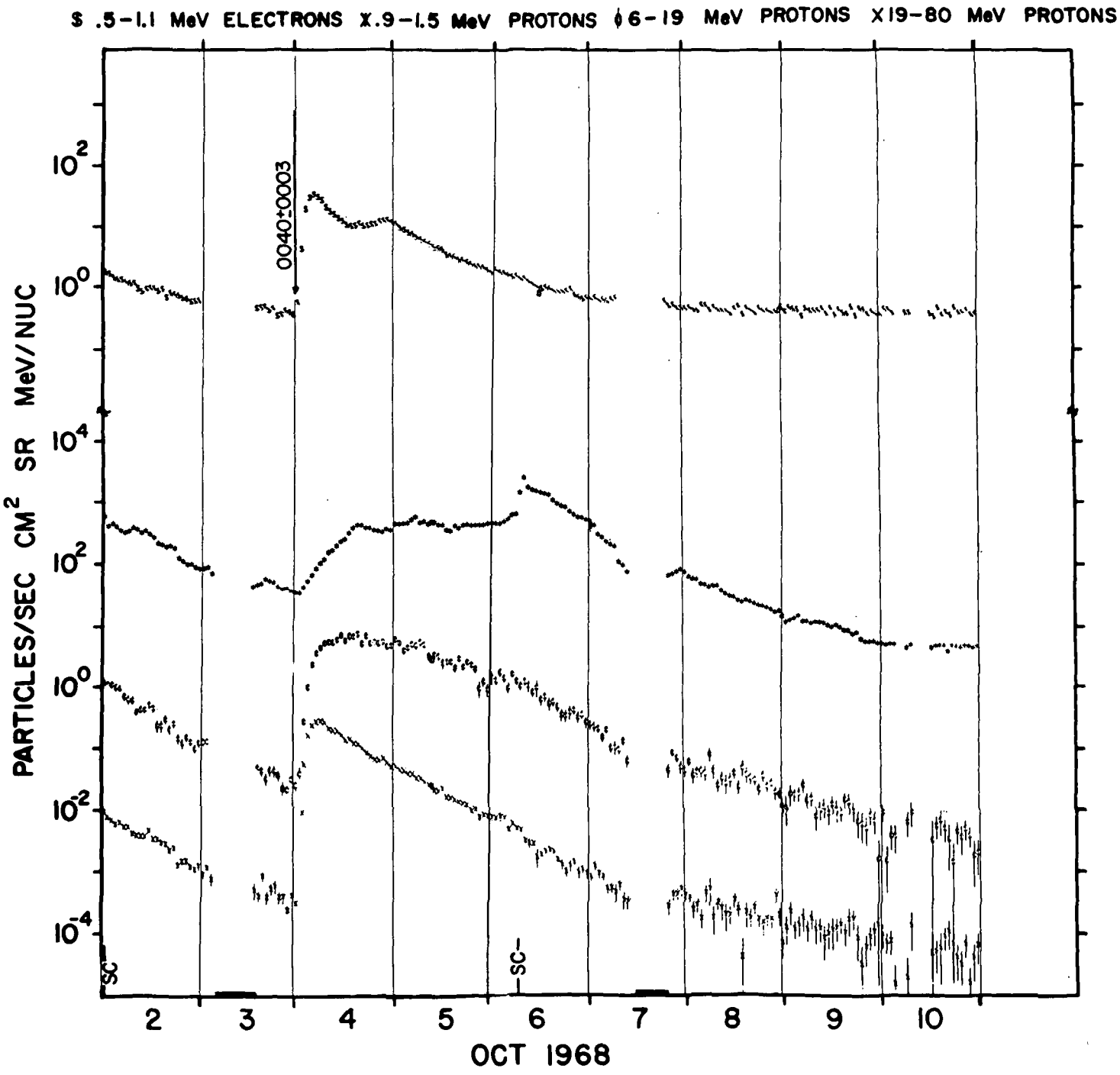
3
4
SEPT.
1968
OCT.


$ .5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0040±0003
SC
SC
2
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4
5
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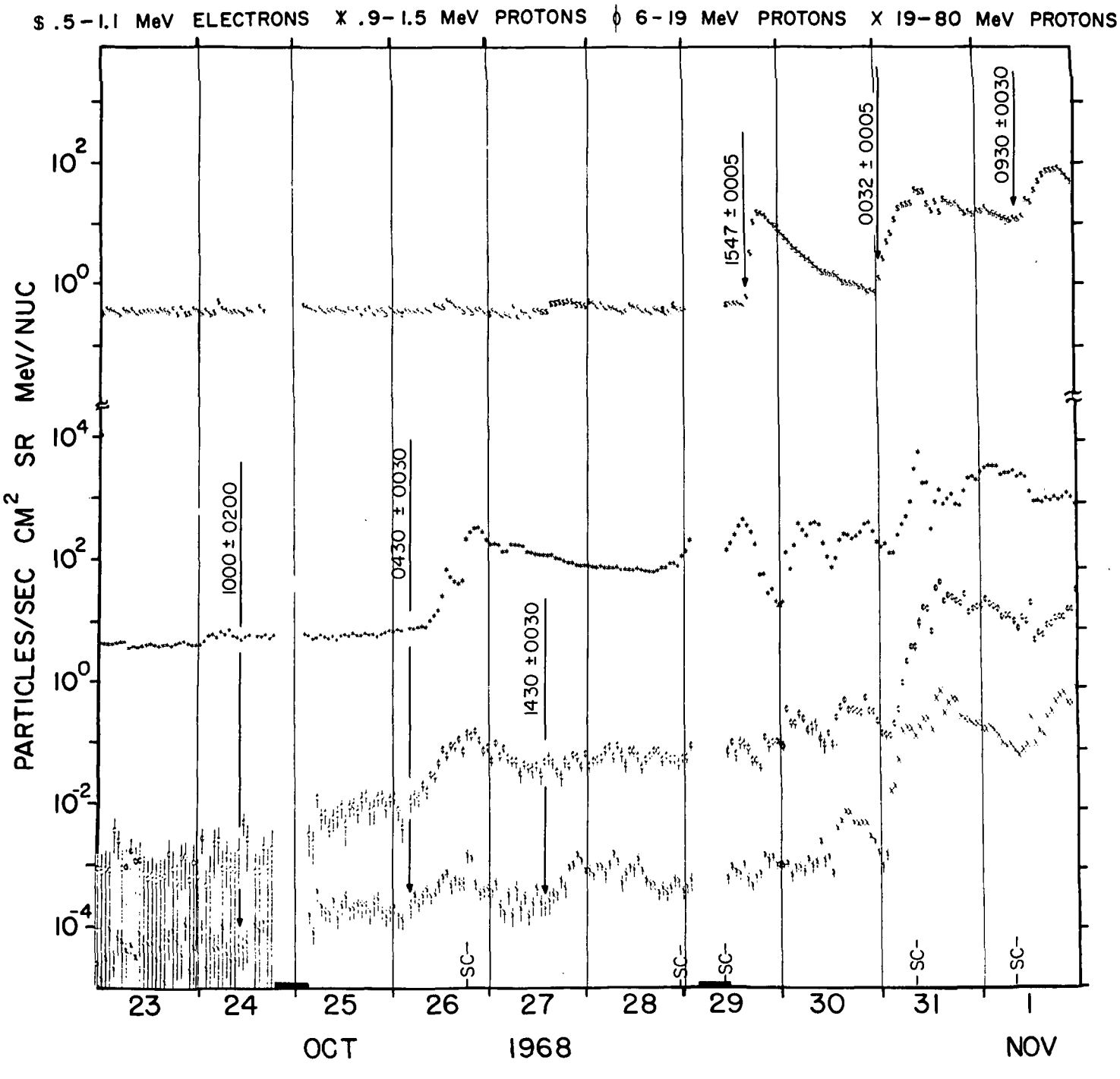
8
9
10
OCT 1968


$ .5 - 1.1 MeV ELECTRONS
X .9 - 1.5 MeV PROTONS
ϕ 6 - 19 MeV PROTONS
X 19 - 80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1000 ± 0200
0430 ± 0030
1430 ± 0030
1547 ± 0005
0032 ± 0005
0930 ± 0030
SC
SC
SC
SC
SC
23
24
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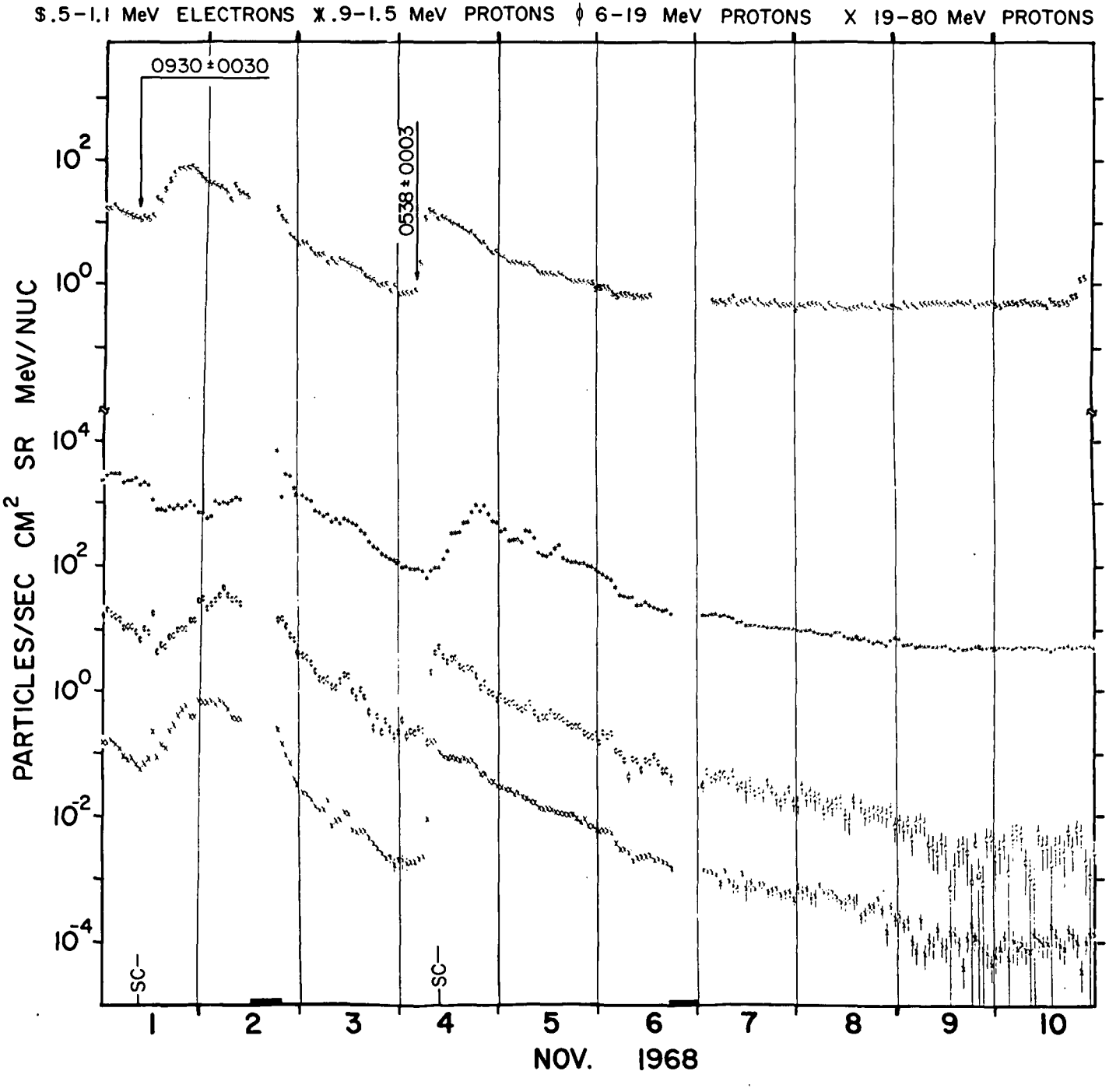
26
27
28
29
30
31
1
OCT
1968
NOV


$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
0930±0030
0538±0003
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
SC
1
2
3
4
5
6
7
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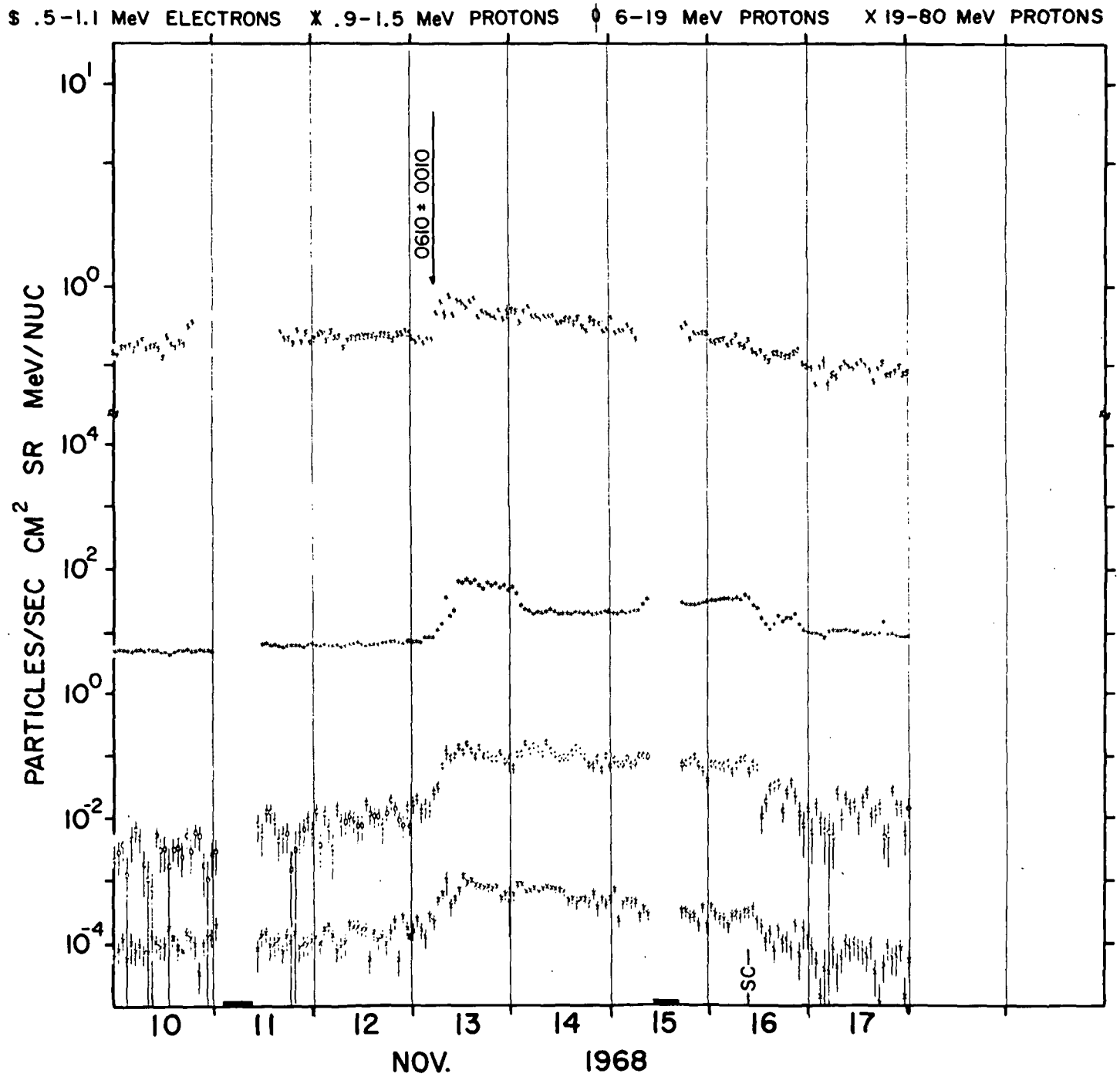
9
10
NOV. 1968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X .9-1.5 MeV PROTONS
0 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0610 ± 0010
SC
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11
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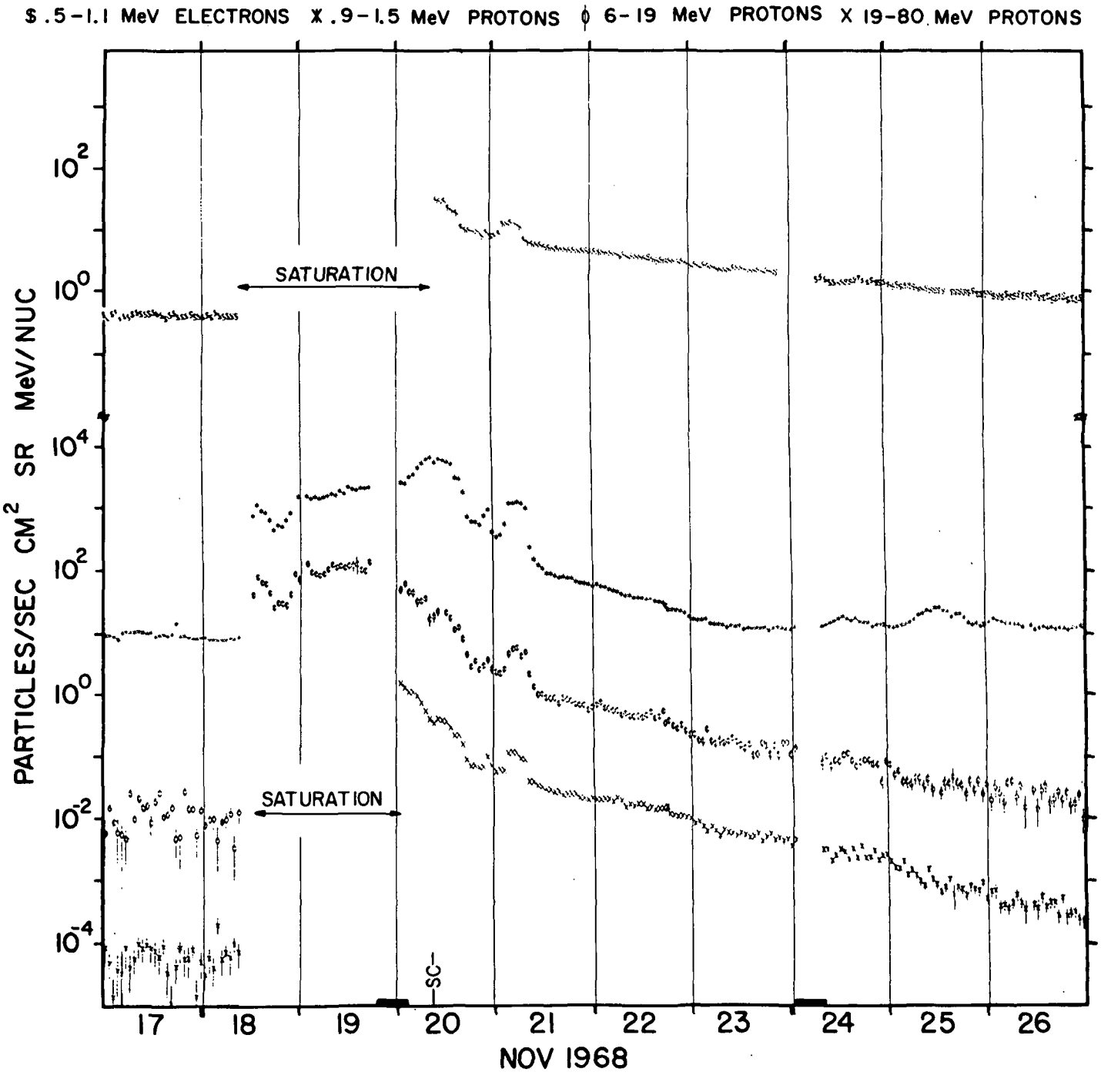
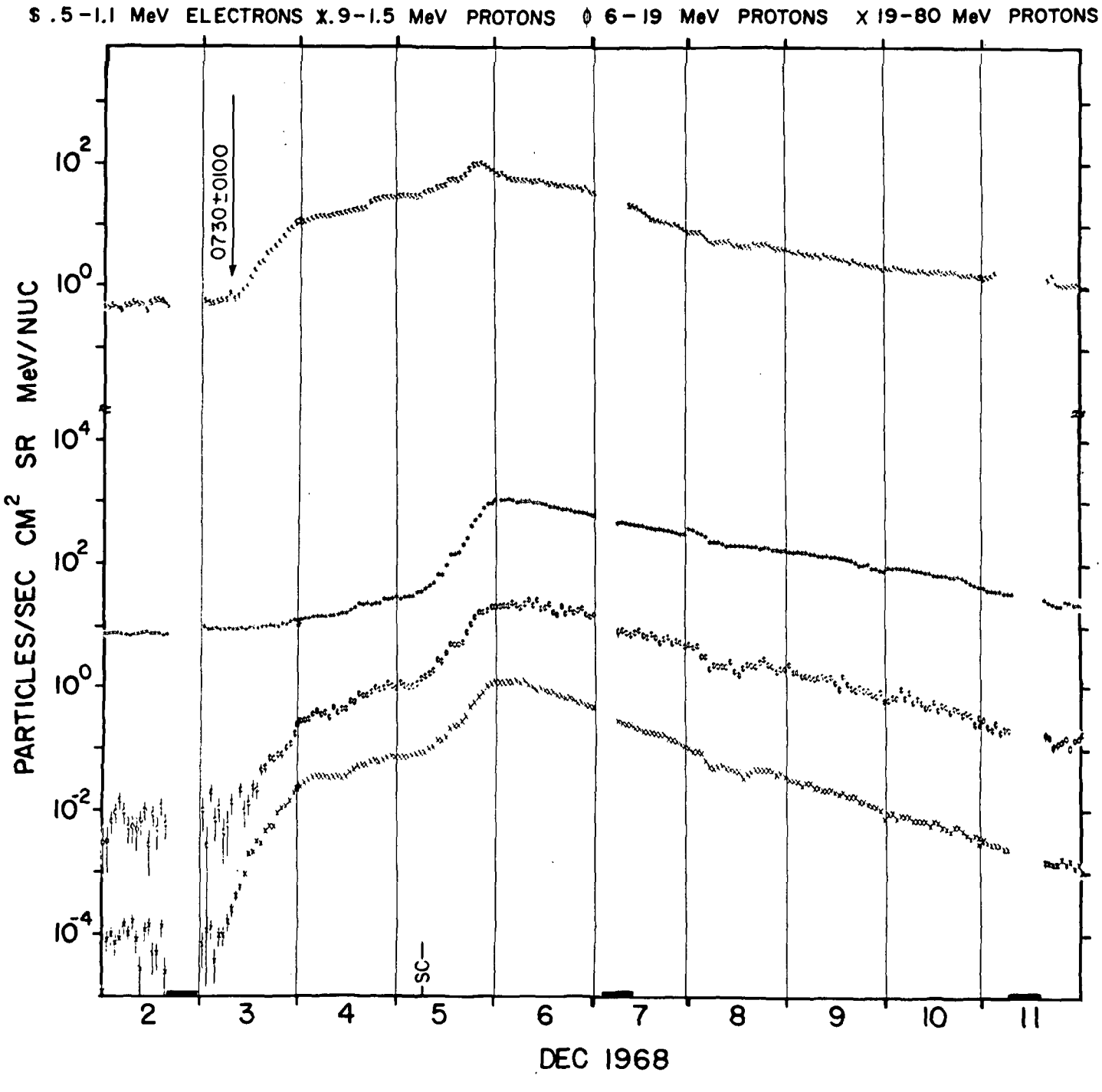
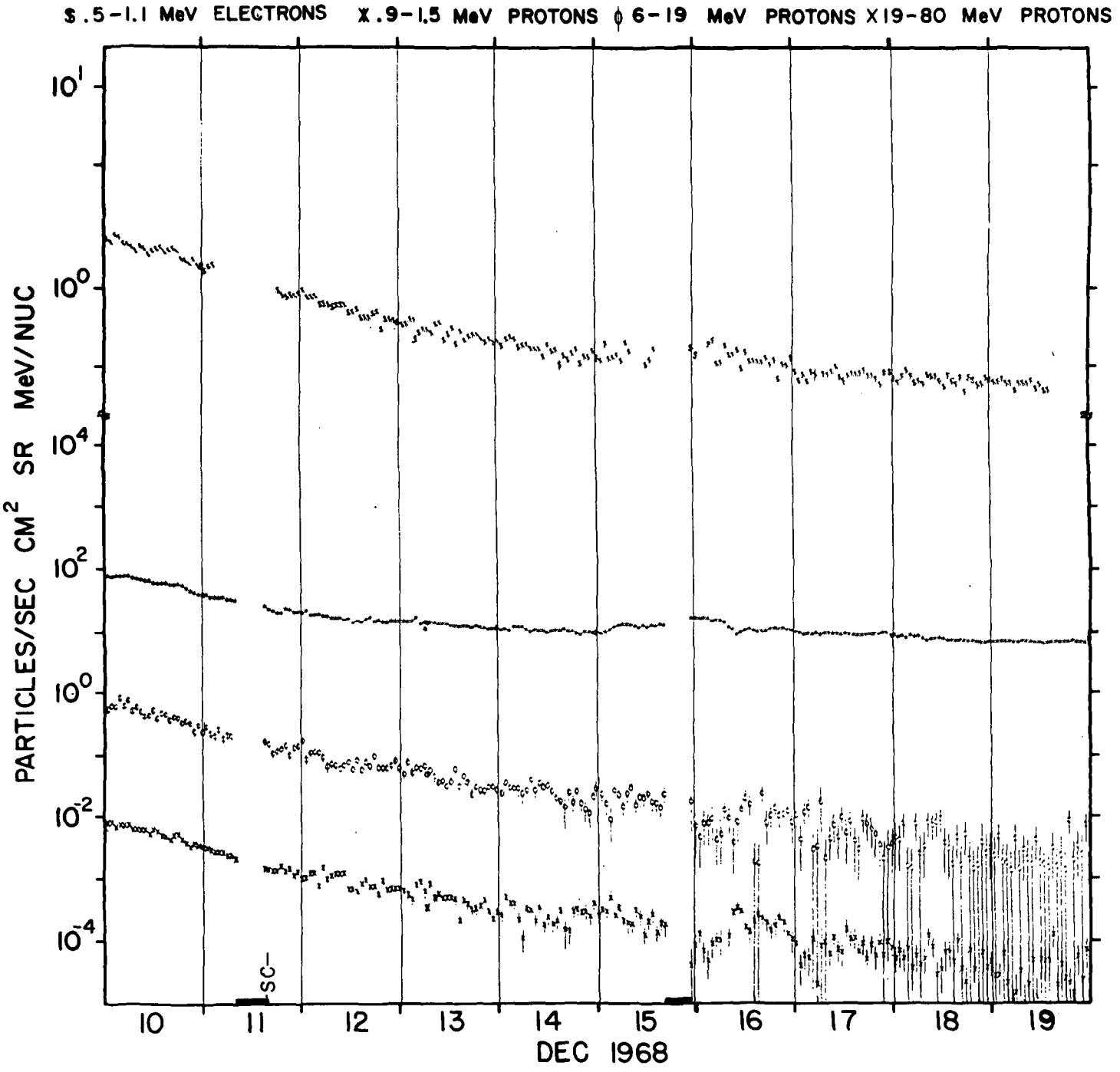
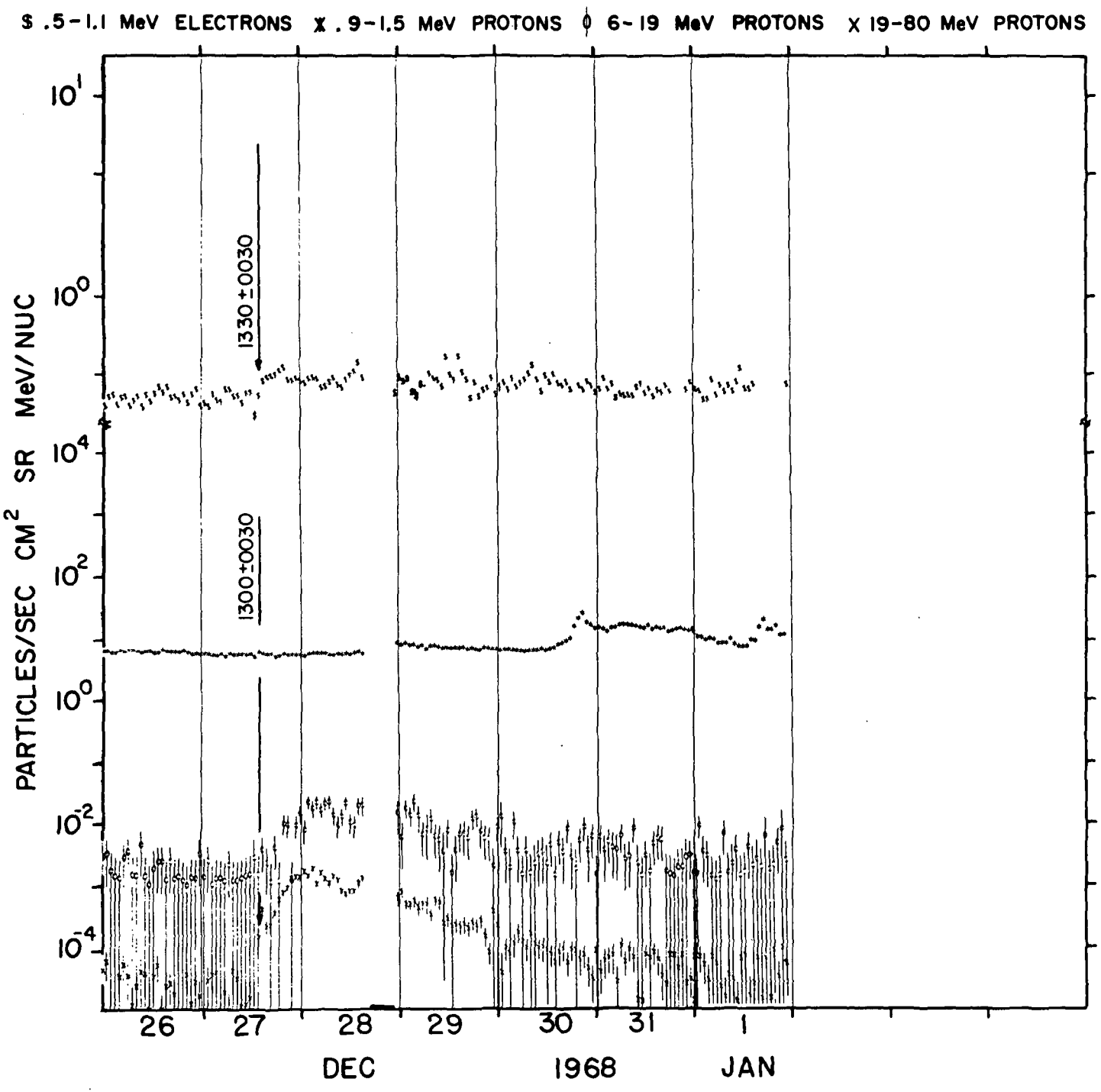
13
14
15
16
17
NOV.
1968


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SATURATION
SATURATION
SC
17
18
19
20
21
22
23
24
25
26
NOV 1968


$ .5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0730±0100
SC
2
3
4
5
6
7
8
9
10
11
DEC 1968


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC-
10
11
12
13
14
15
16
17
18
19
DEC 1968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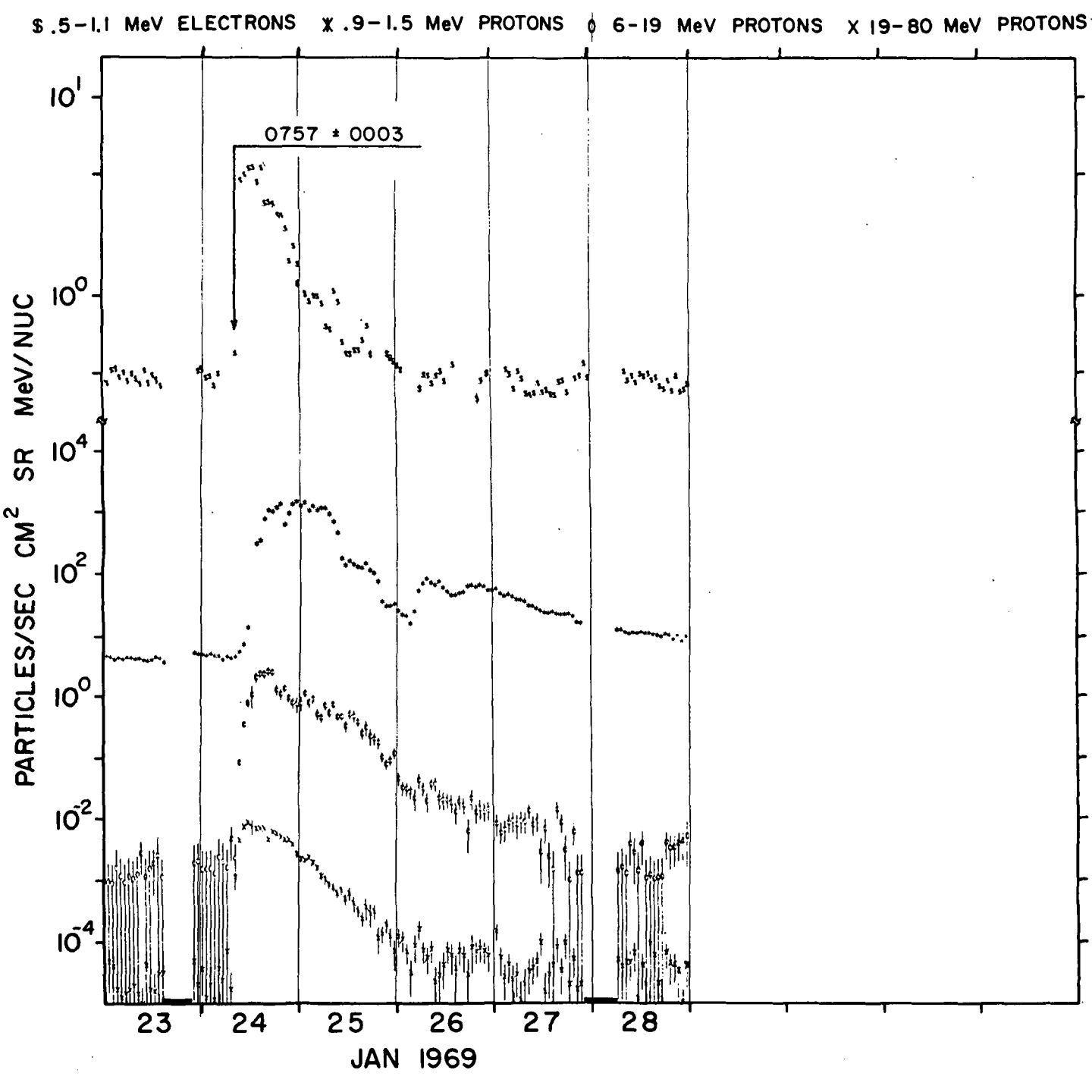
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1330±0030
1300±0030
26
27
28
29
30
31
1
DEC
1968
JAN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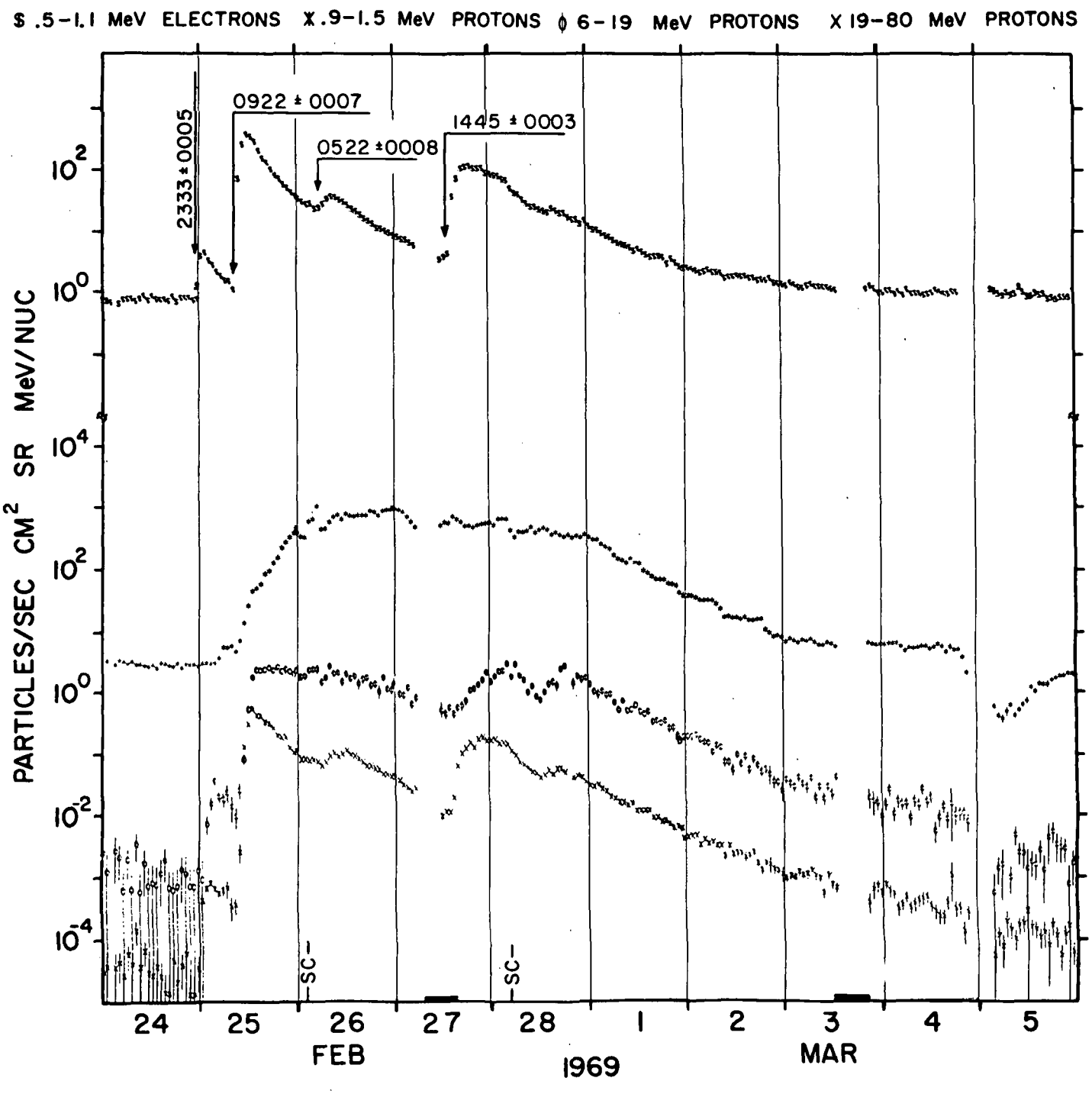
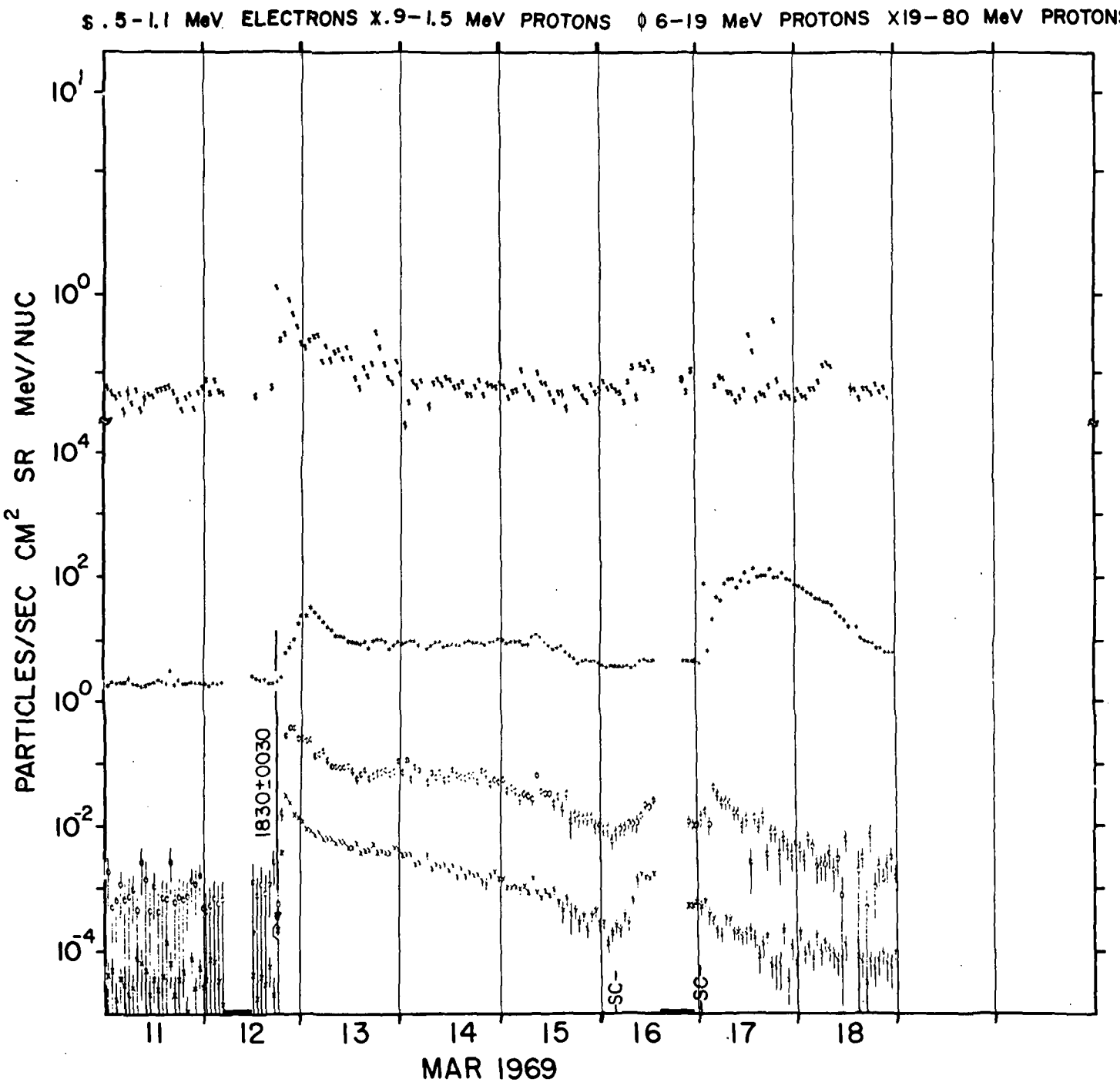
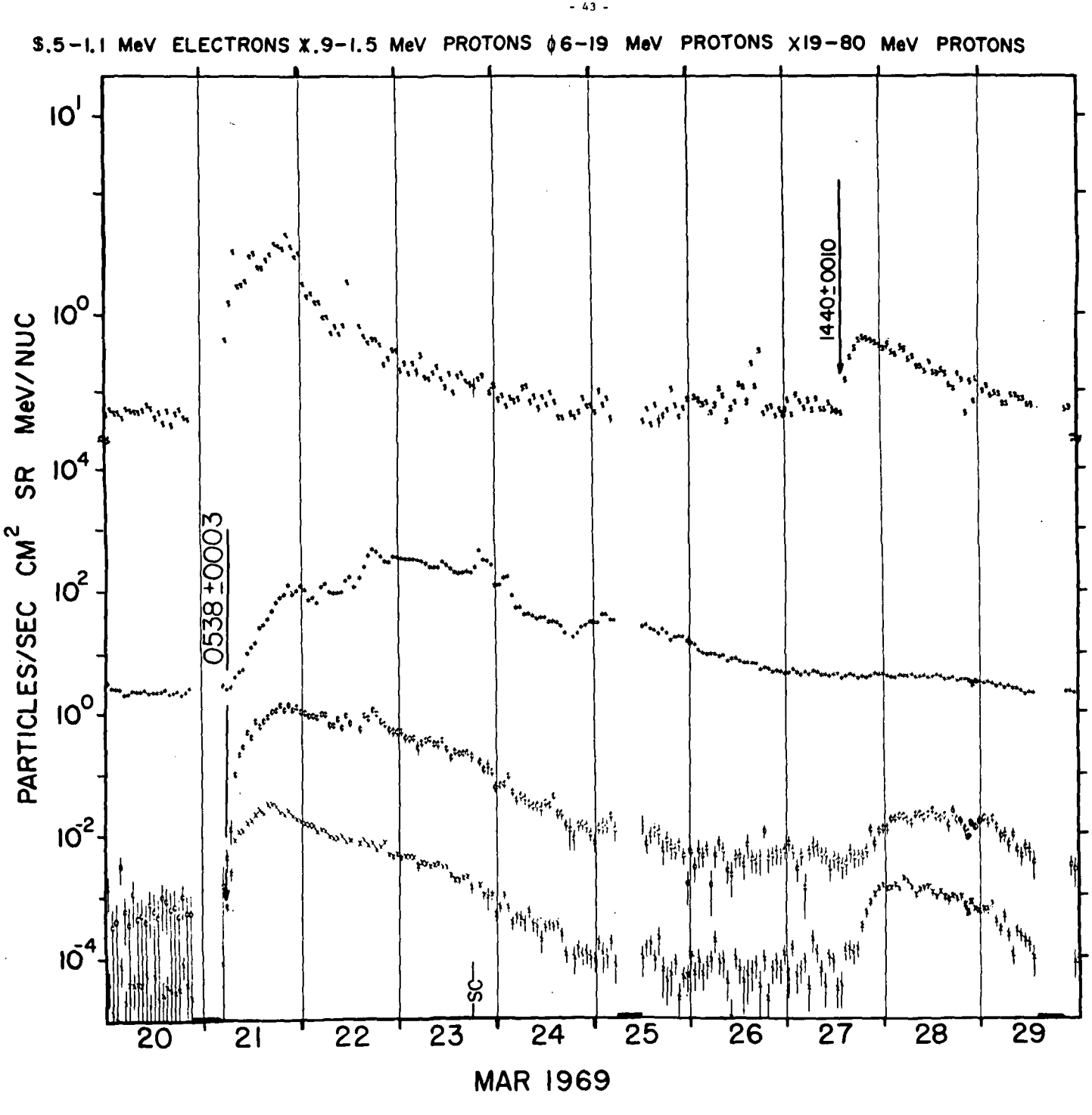
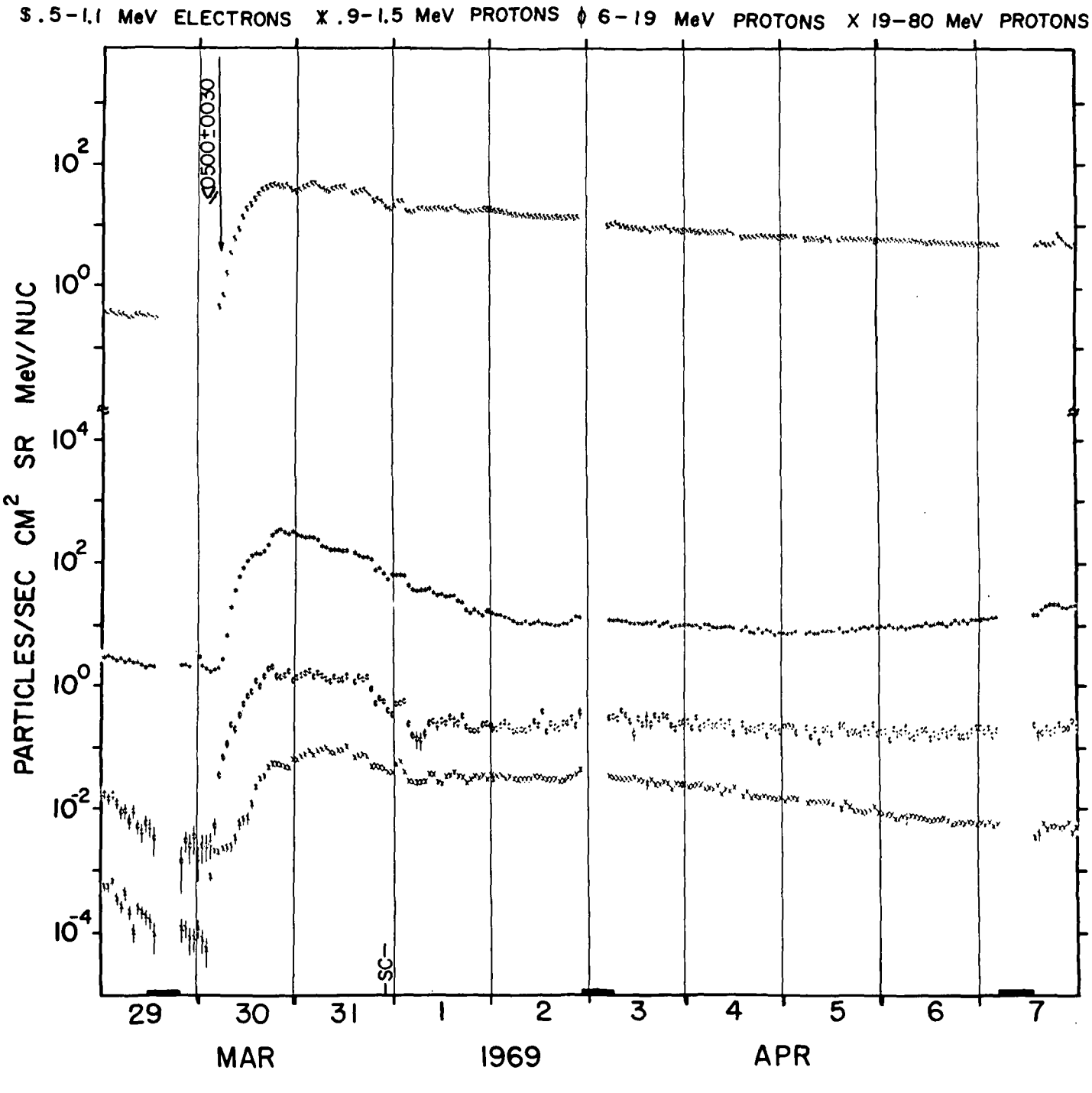
0757 ± 0003
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
23
24
25
26
27
28
JAN 1969


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
2333±0005
0922 ± 0007
0522 ±0008
1445 ± 0003
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC-
SC-
24
25
26
27
28
1
2
3
4
5
FEB
1969
MAR


$ .5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1830±0030
SC-
SC
11
12
13
14
15
16
17
18
MAR 1969


$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0538±0003
1440±0010
SC
20
21
22
23
24
25
26
27
28
29
MAR 1969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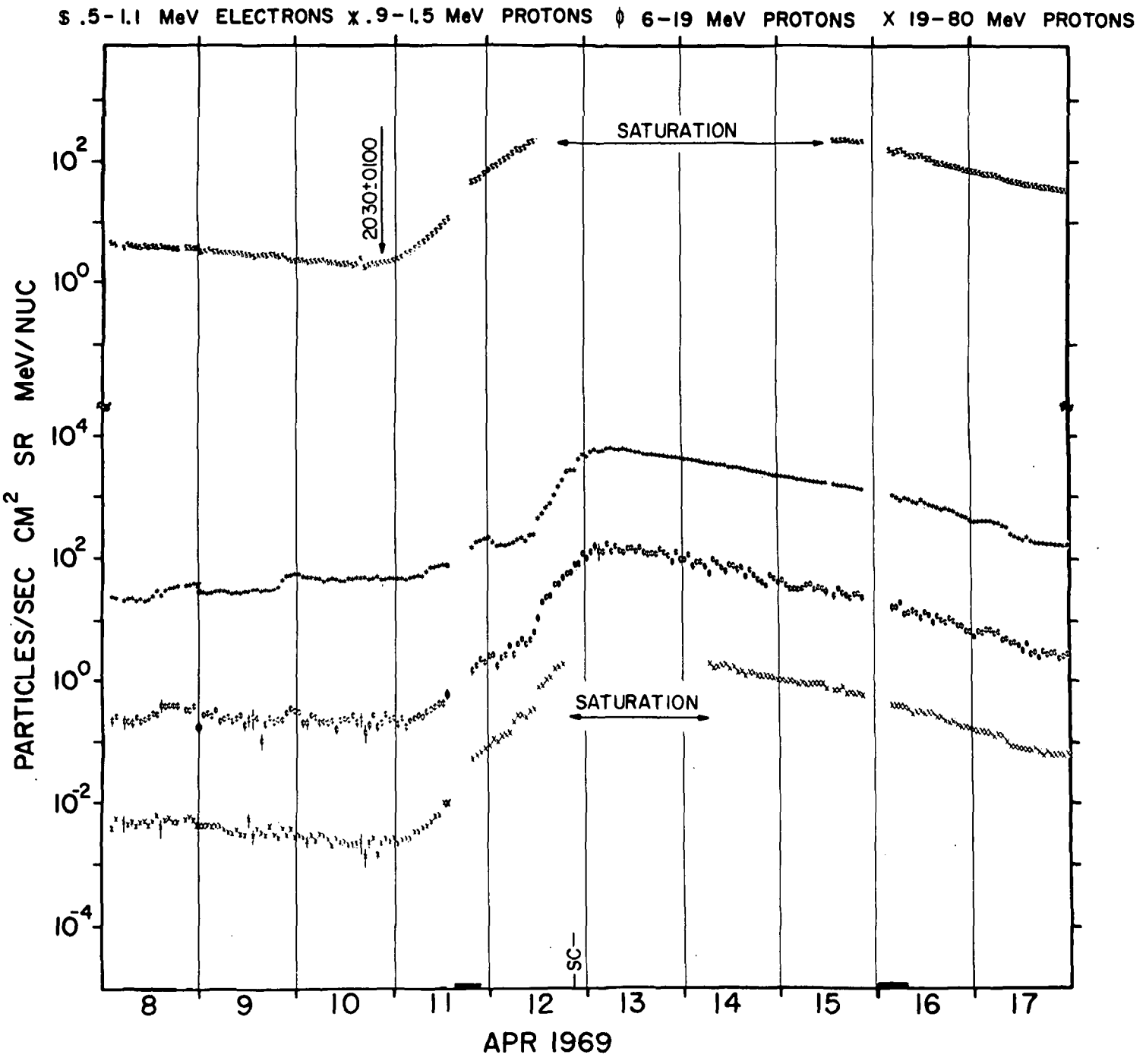
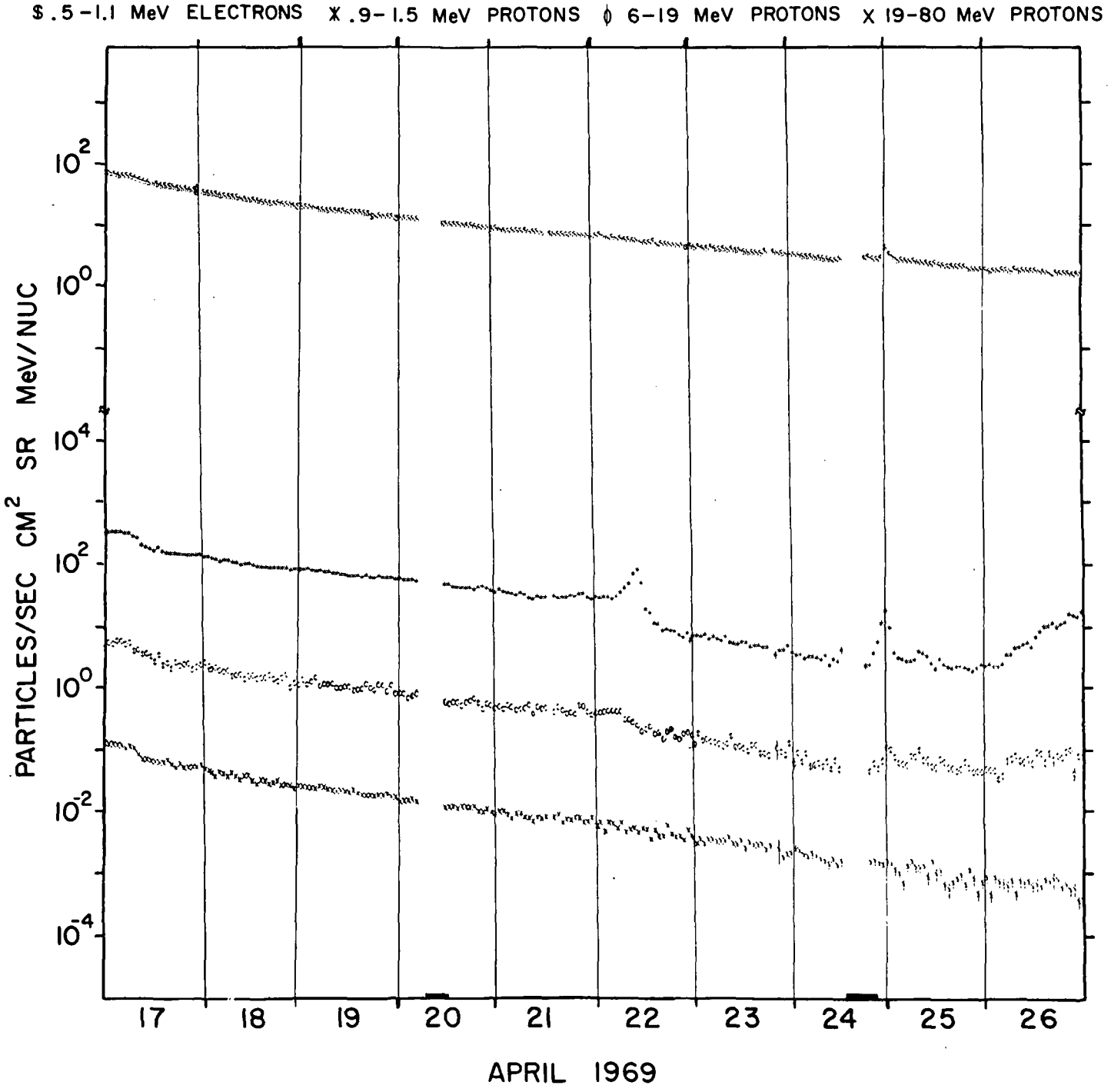
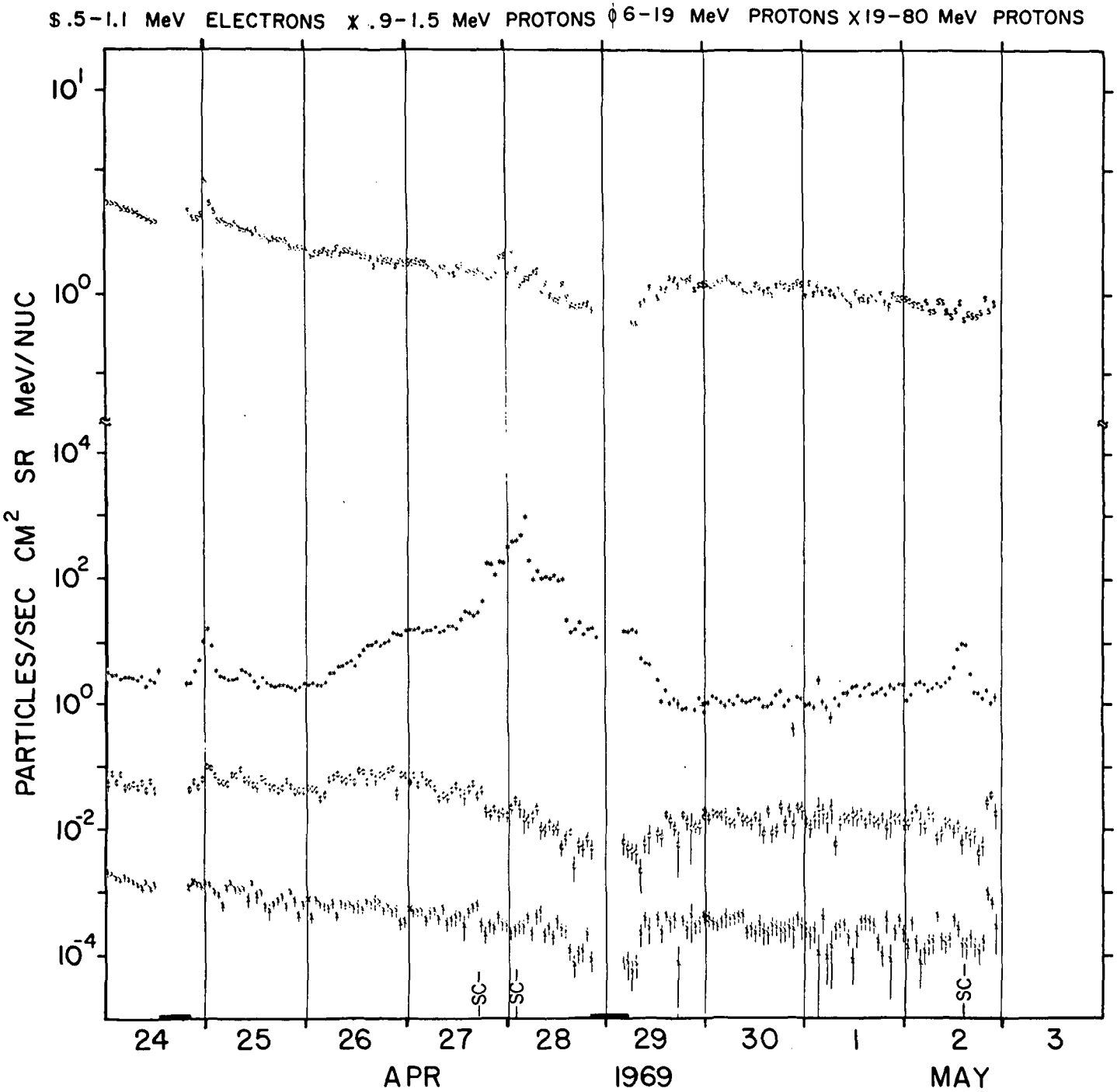
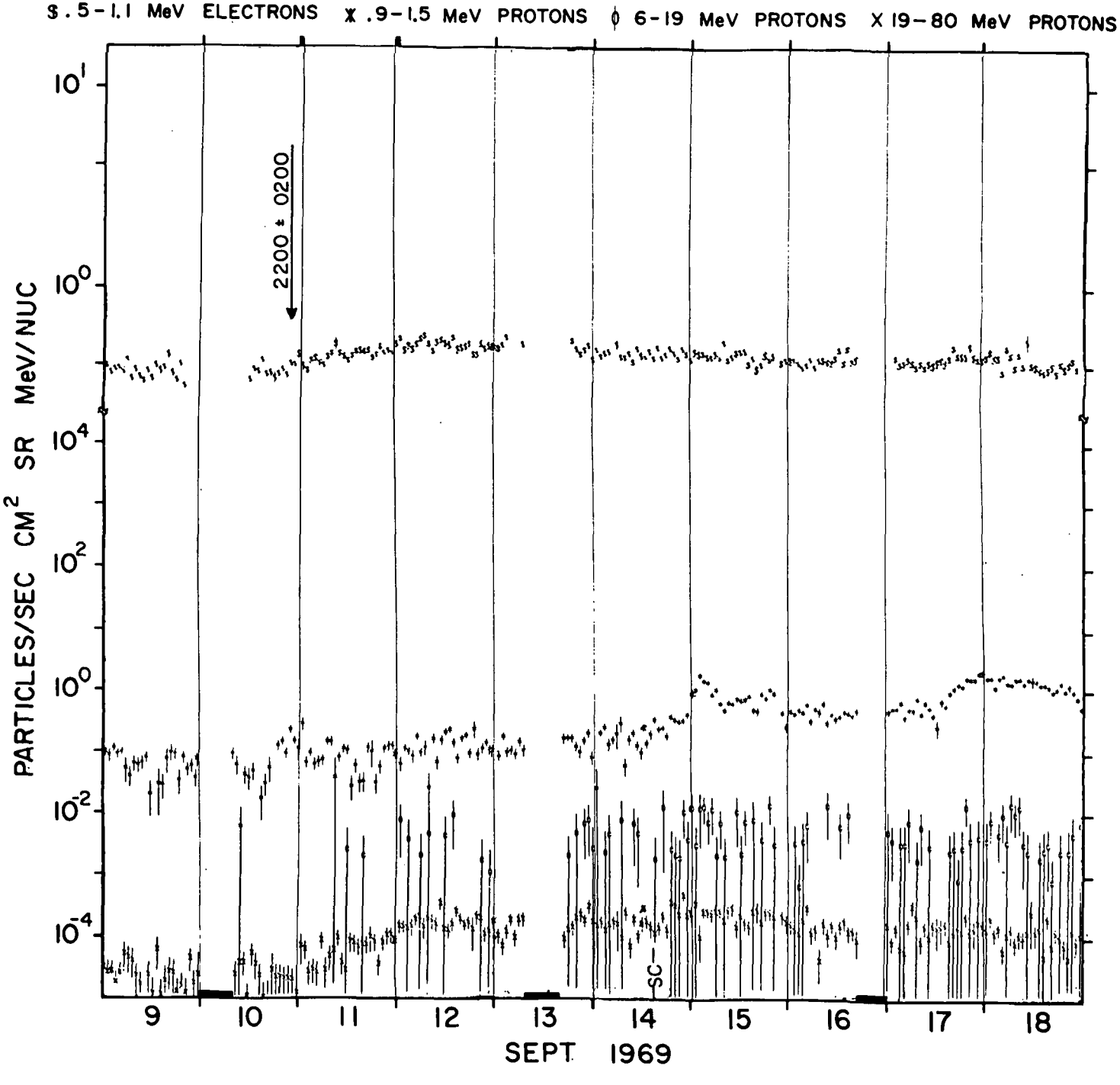
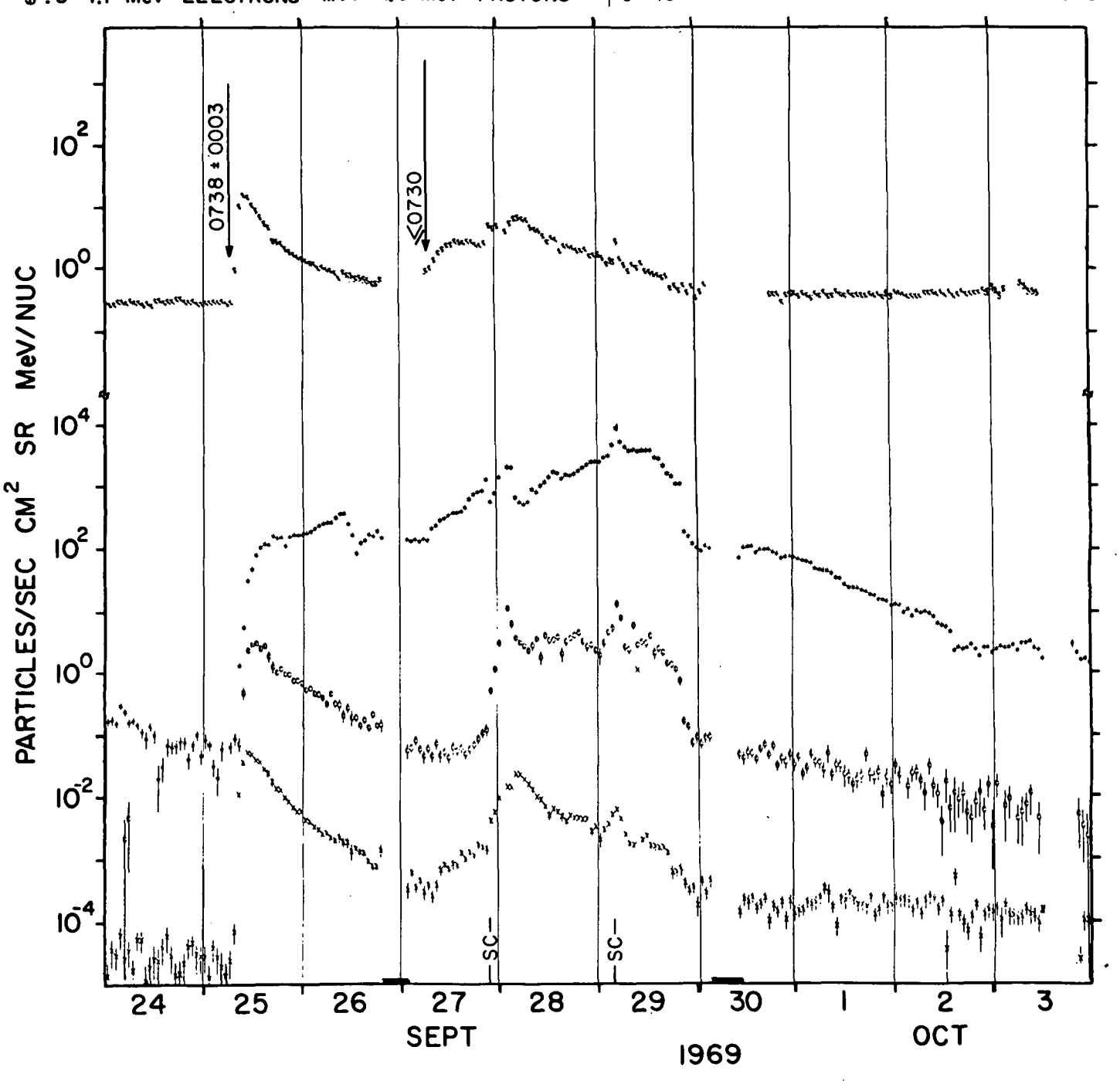
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0500±0030
SC
29
30
31
1
2
3
4
5
6
7
MAR
1969
APR

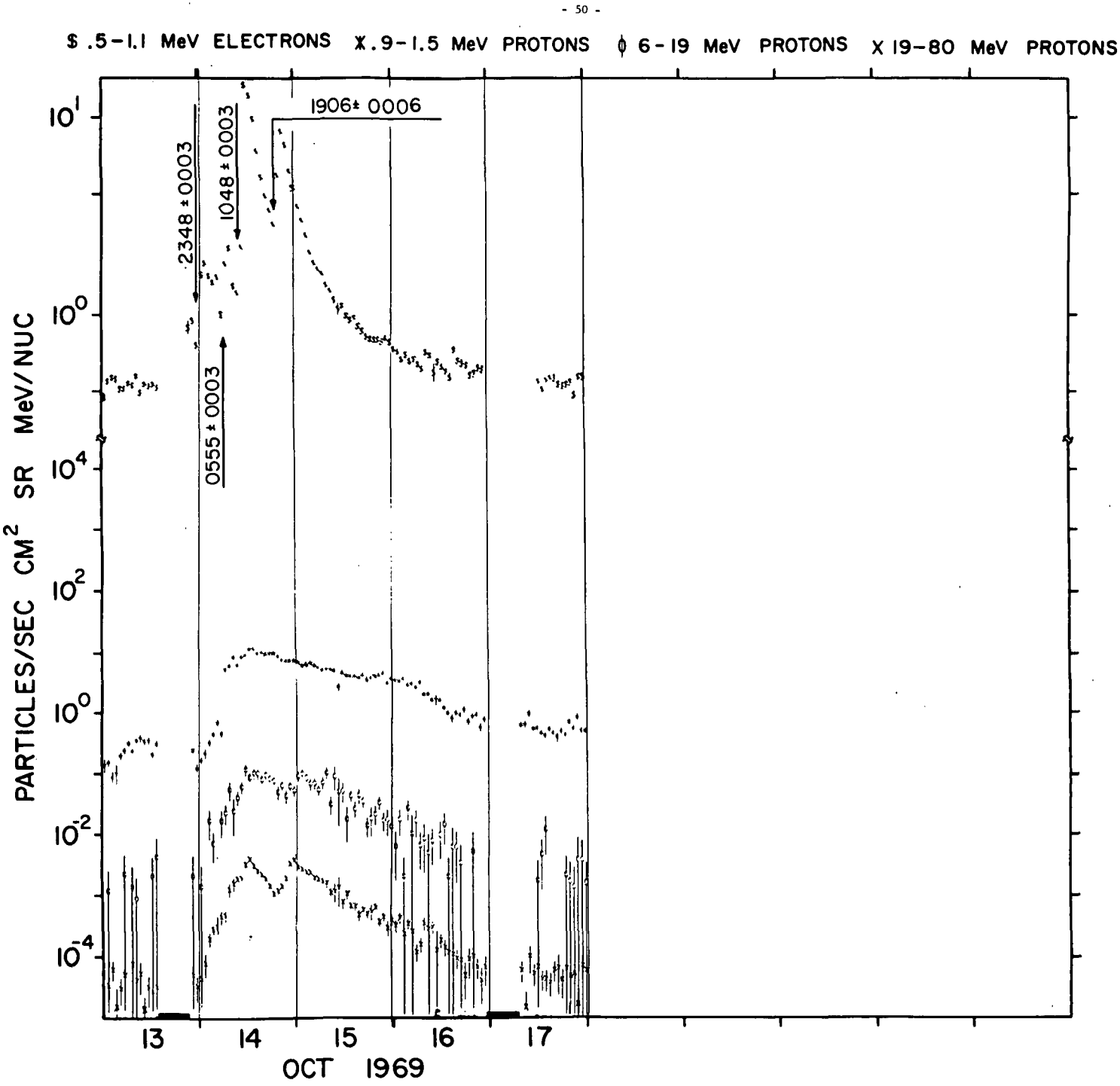

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2030-0100
SATURATION
SATURATION
SC
8
9
10
11
12
13
14
15
16
17
APR 1969

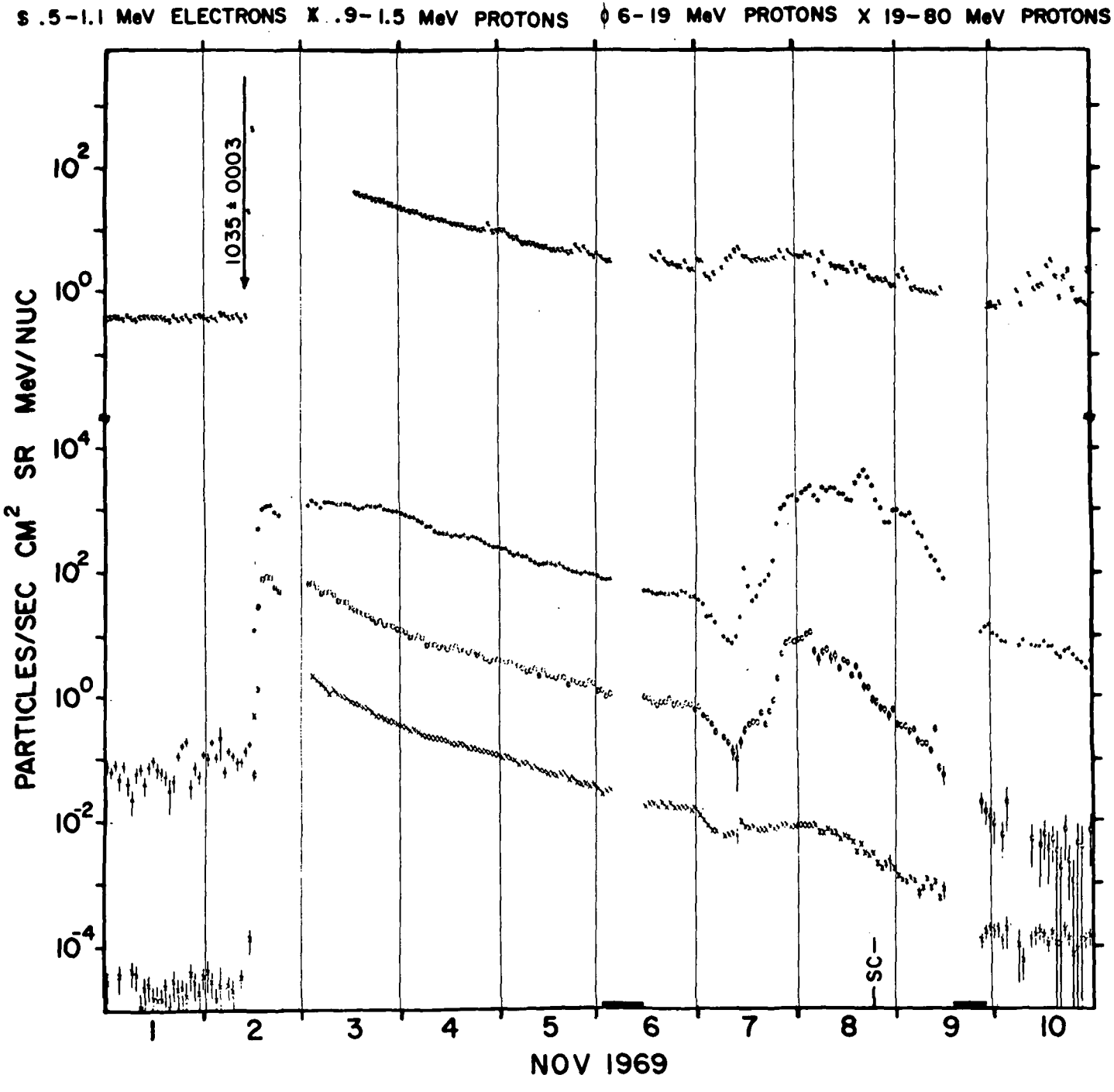

$ .5 - 1.1 MeV ELECTRONS X .9 - 1.5 MeV PROTONS ϕ 6 - 19 MeV PROTONS X 19 - 80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
17
18
19
20
21
22
23
24
25
26
APRIL 1969

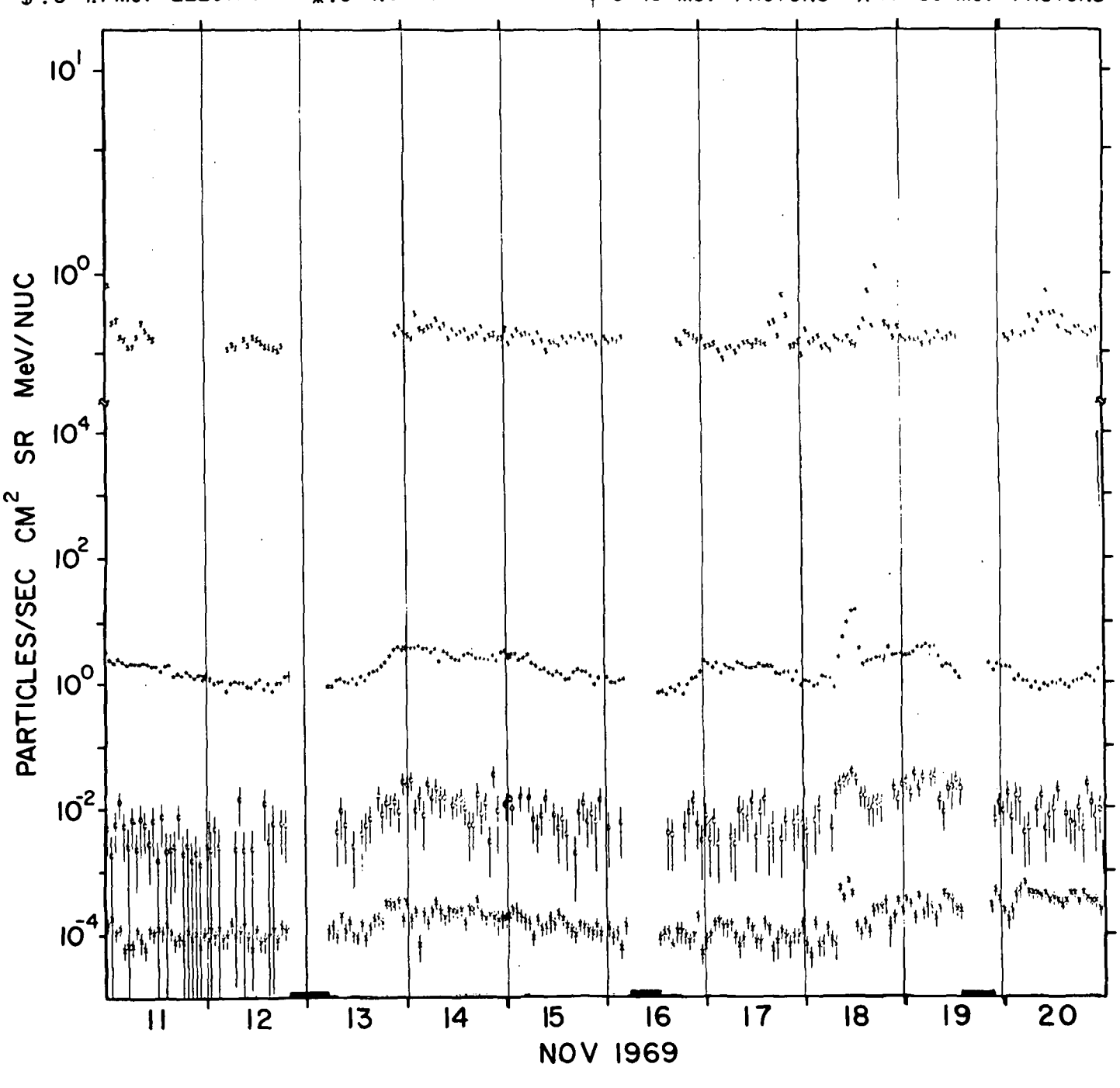

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM2 SR MeV/NUC
10^1
10^0
10^4
10^2
10^0
10^-2
10^-4
SC-
SC-
SC-
24
25
26
27
28
29
30
1
2
3
APR
1969
MAY

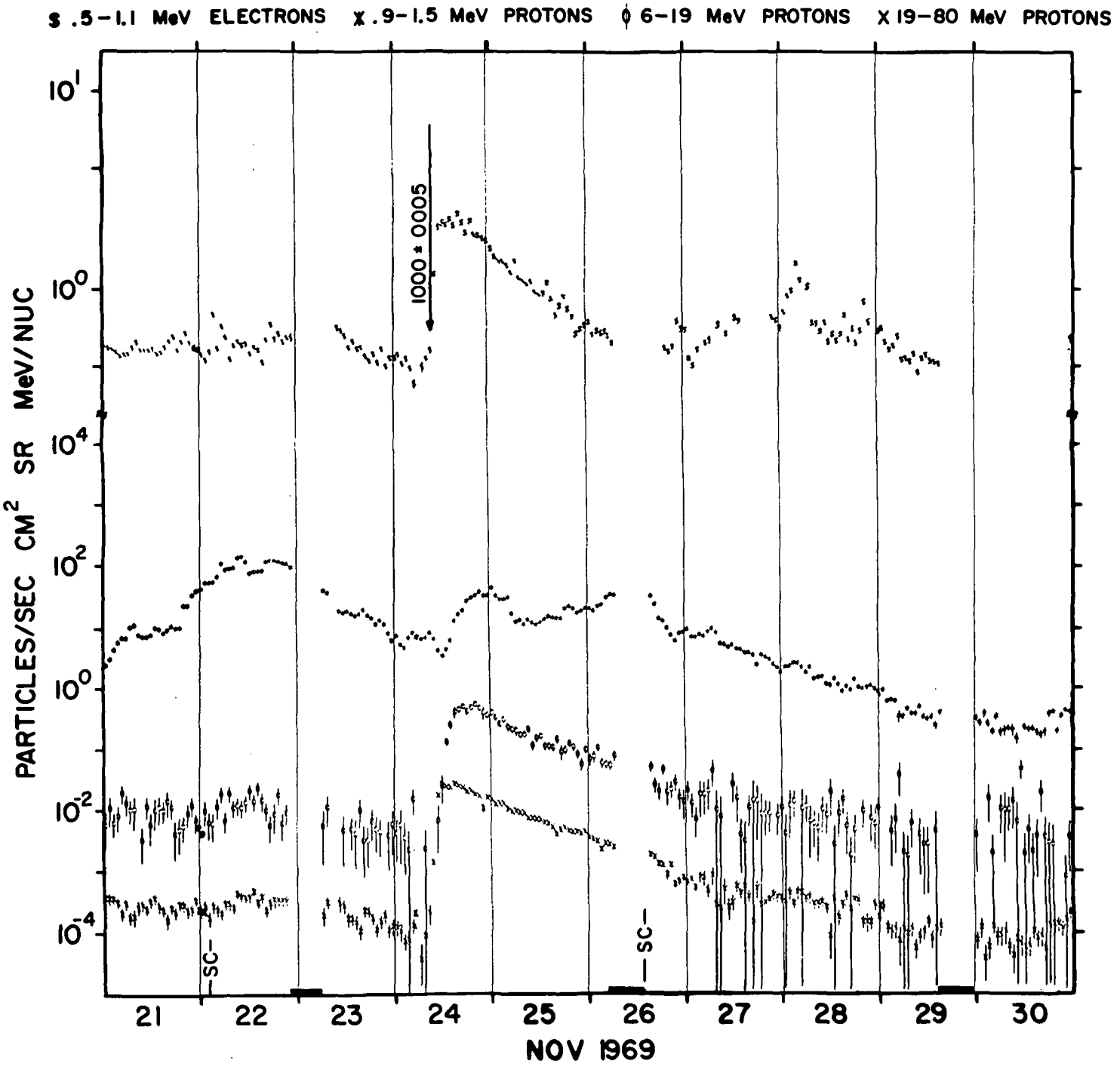

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2200 ± 0200
SC
9
10
11
12
13
14
15
16
17
18
SEPT 1969

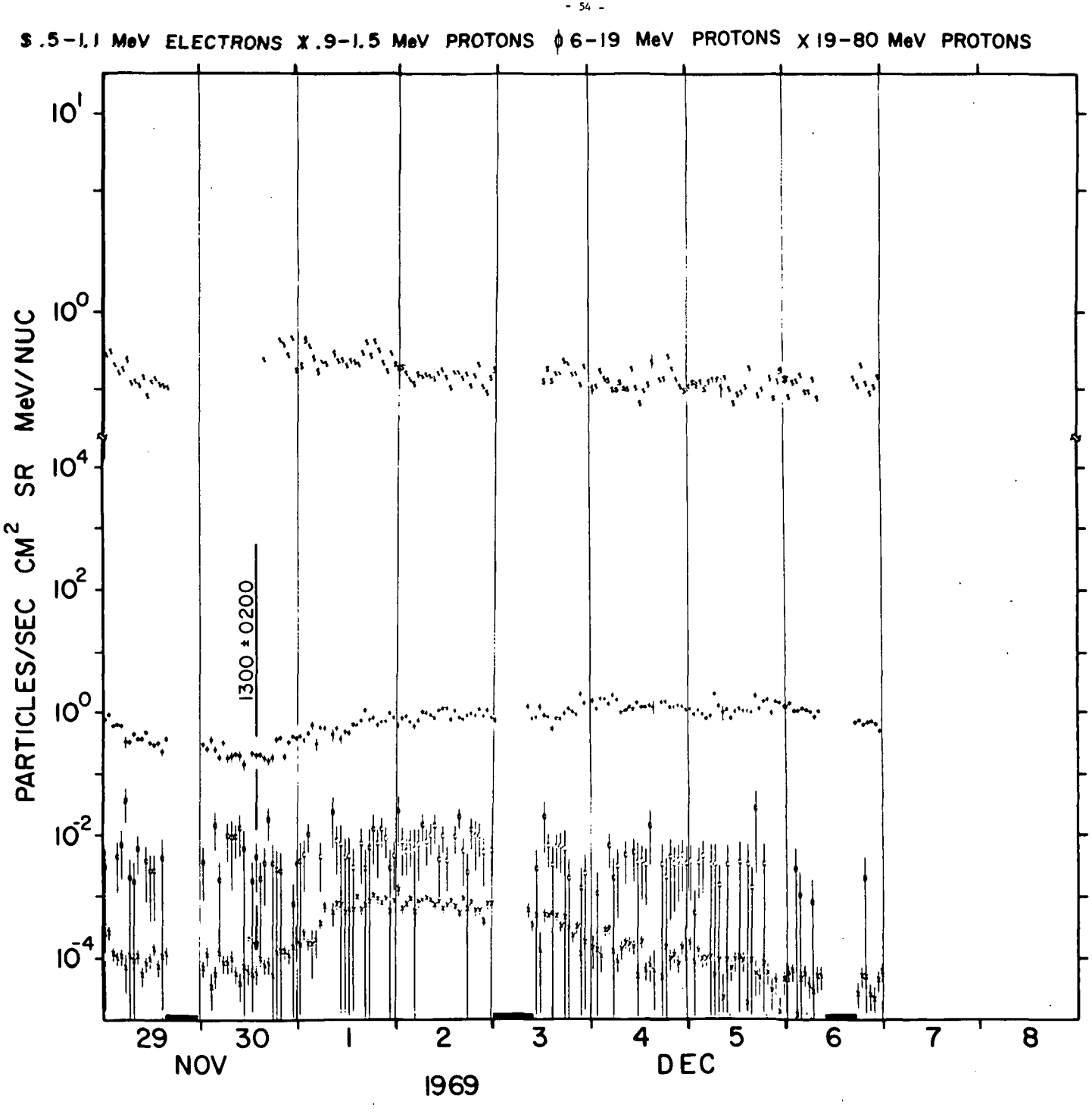

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0738±0003
≤0730
SC
SC
24
25
26
27
28
29
30
1
2
3
SEPT
OCT
1969

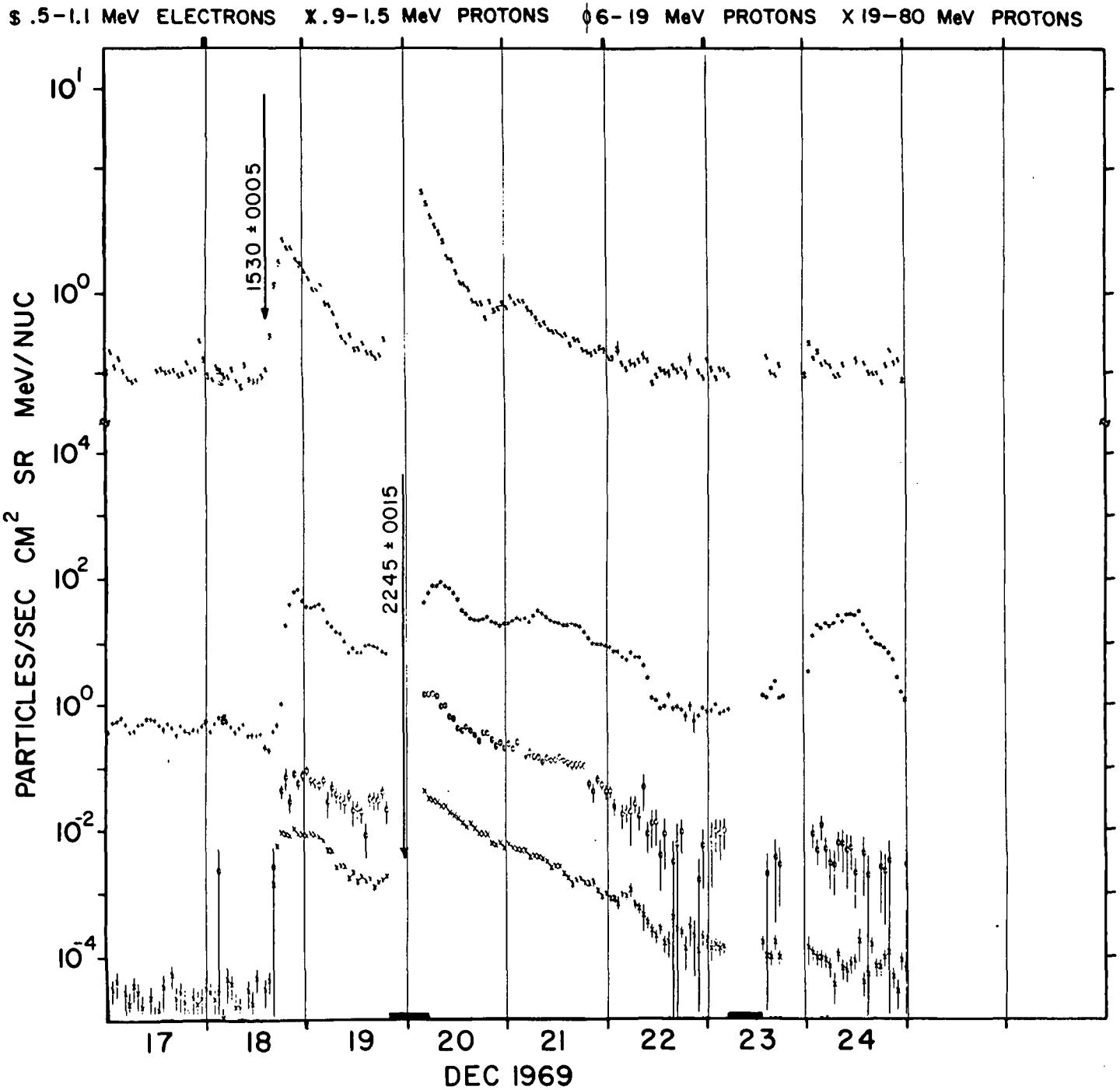

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2348±0003
1048±0003
1906±0006
0555±0003
13
14
15
16
17
OCT 1969

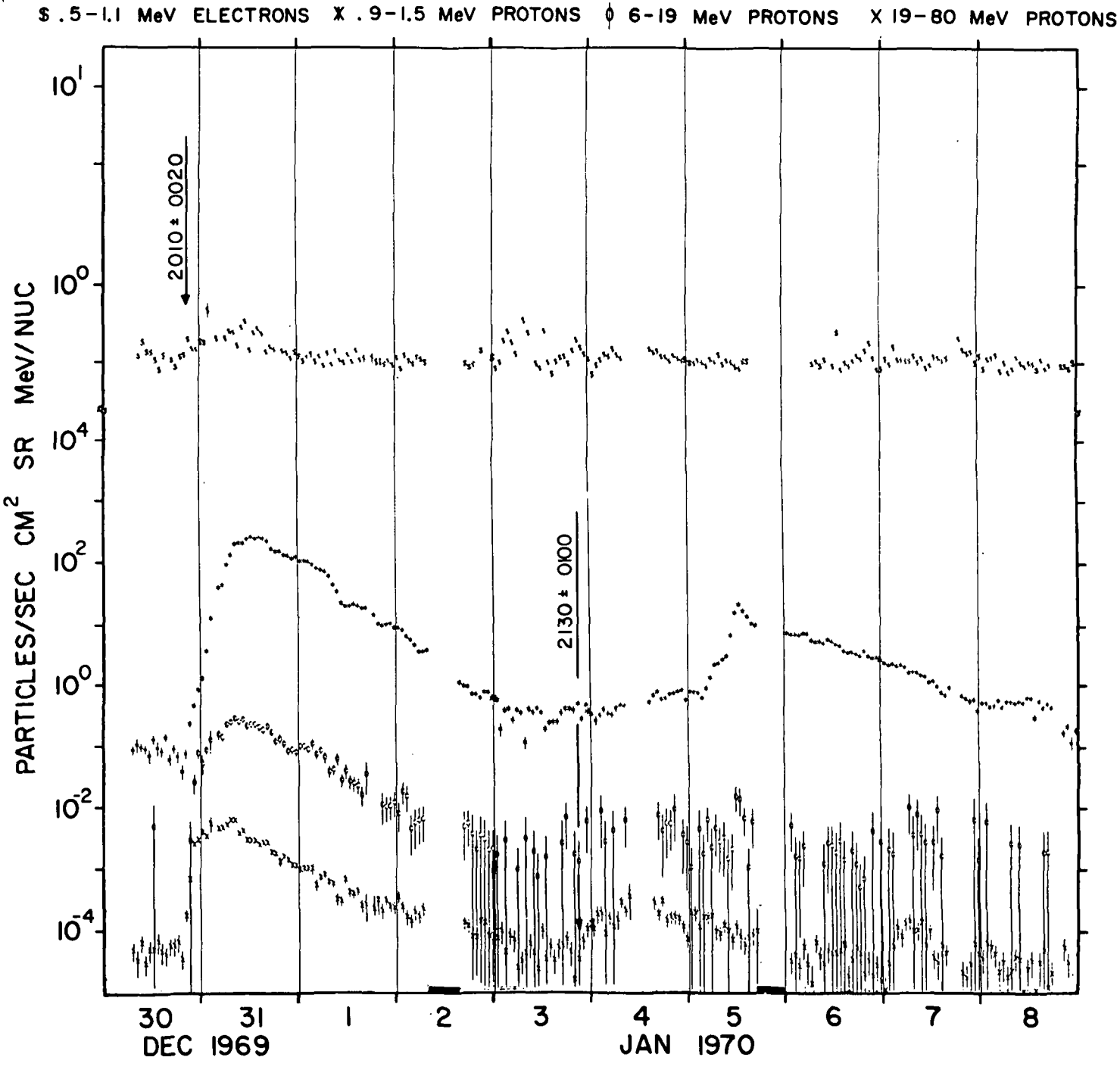

S .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1035 ± 0003
SC
1
2
3
4
5
6
7
8
9
10
NOV 1969

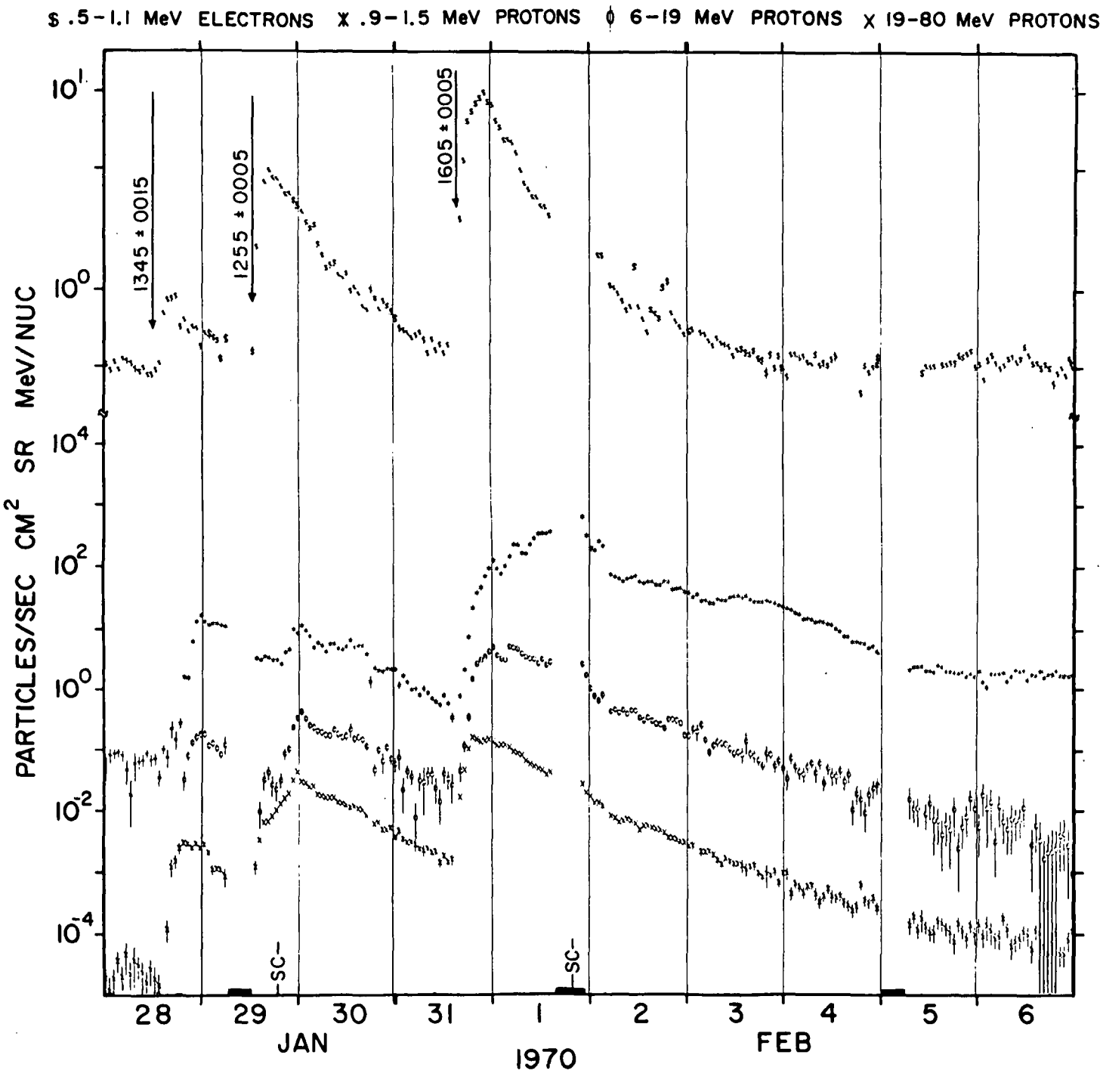

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
11
12
13
14
15
16
17
18
19
20
NOV 1969


$ .5-1.1 MeV ELECTRONS
x .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1000 ± 0005
SC
SC
21
22
23
24
25
26
27
28
29
30
NOV 1969


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1300 ± 0200
29
30
1
2
3
4
5
6
7
8
NOV
DEC
1969


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
φ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1530 ± 0005
2245 ± 0015
17
18
19
20
21
22
23
24
DEC 1969


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2010 ± 0020
2130 ± 0100
30 31 1 2 3 4 5 6 7 8
DEC 1969
JAN 1970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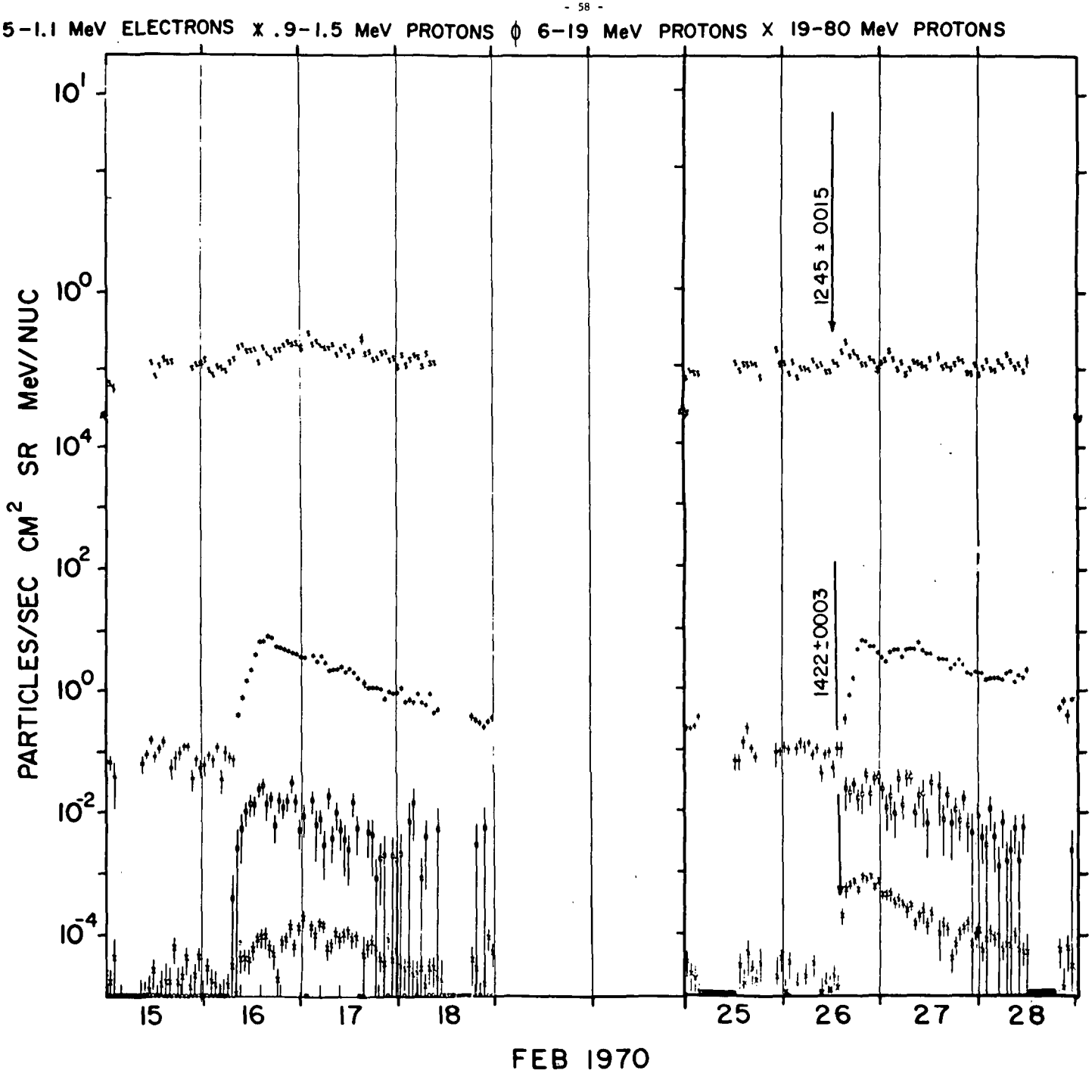
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1345 ± 0015
1255 ± 0005
1605 ± 0005
SC-
SC-
28
29
30
31
1
2
3
4
5
6
JAN
1970
FEB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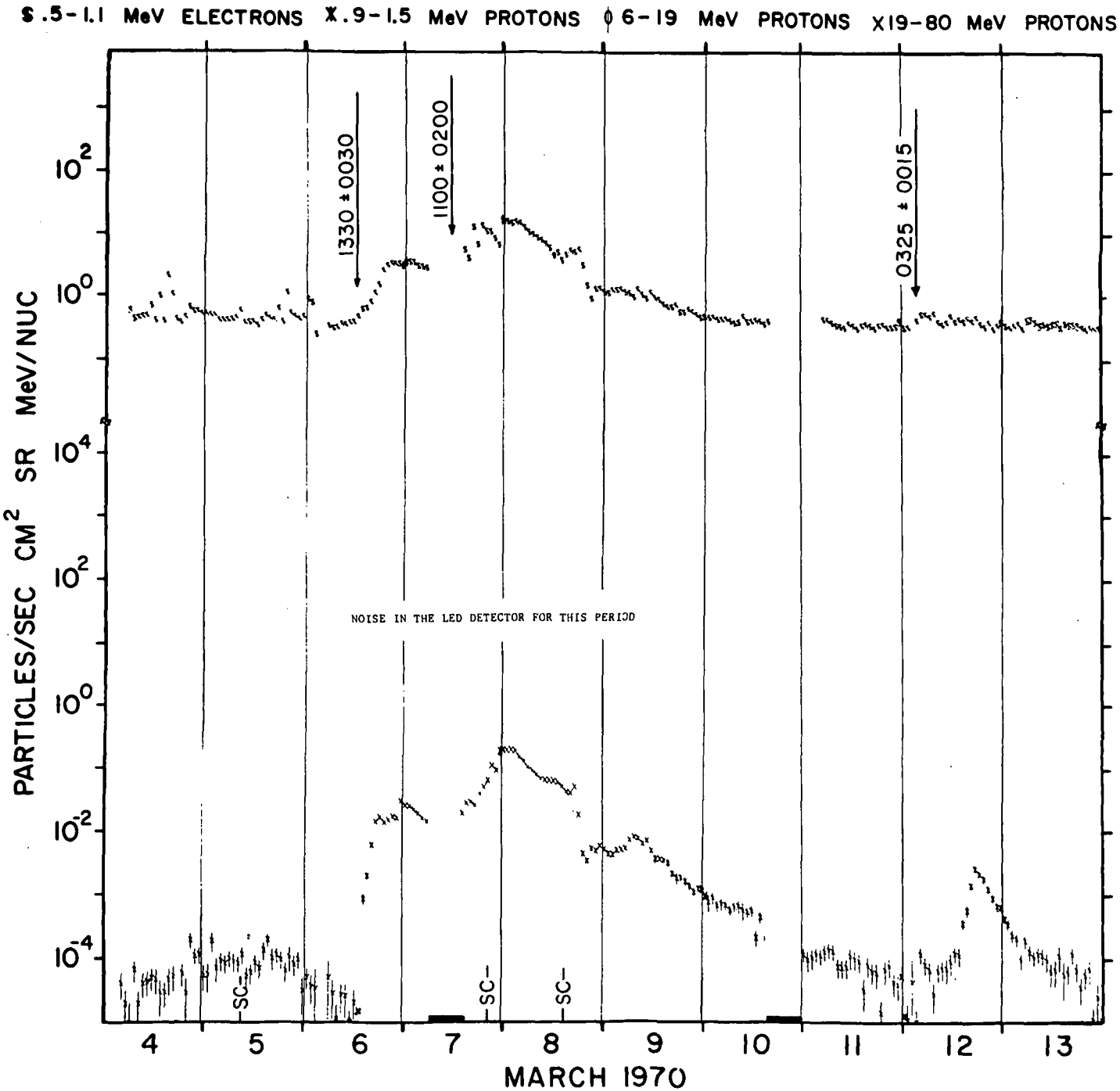
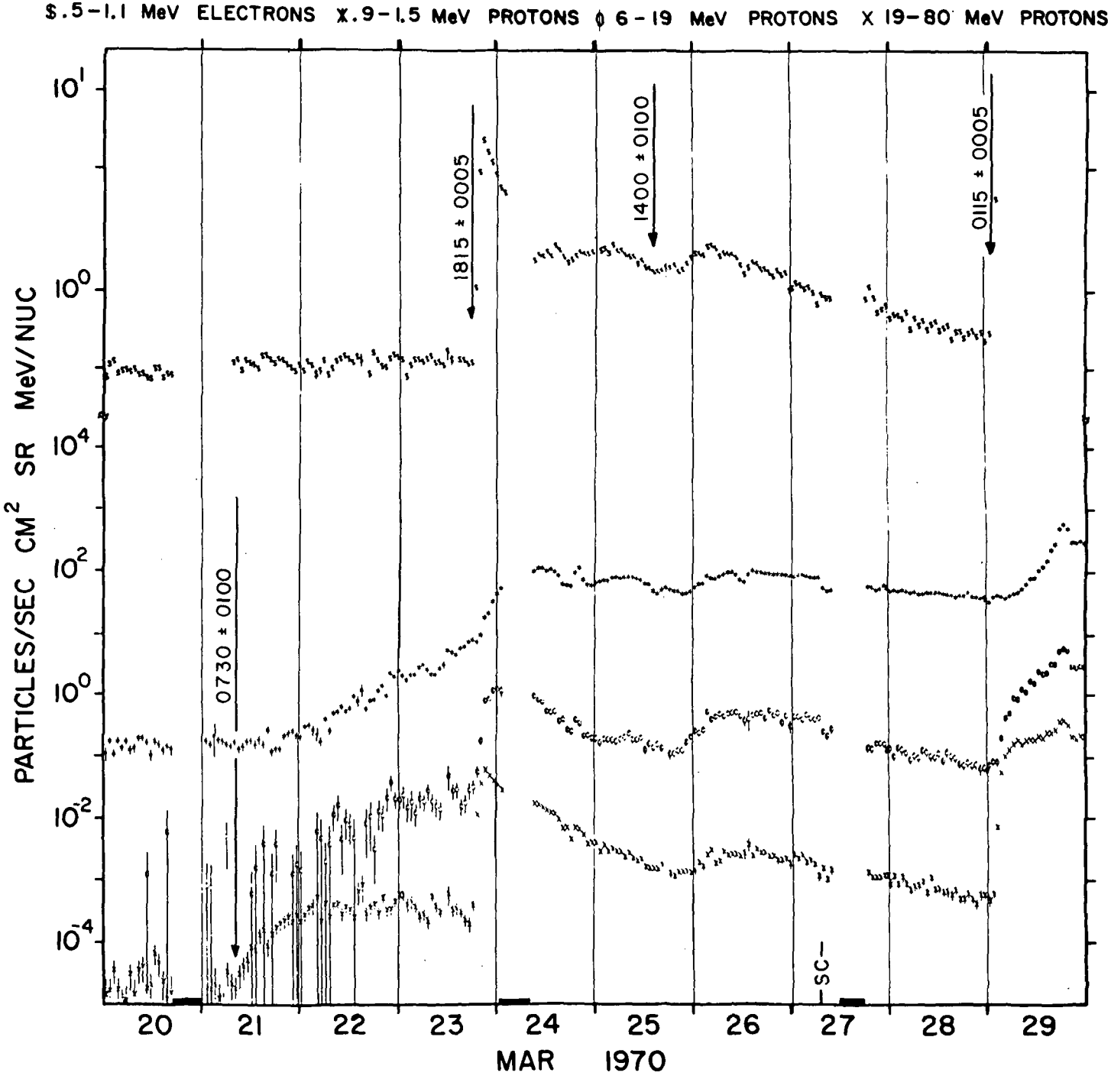
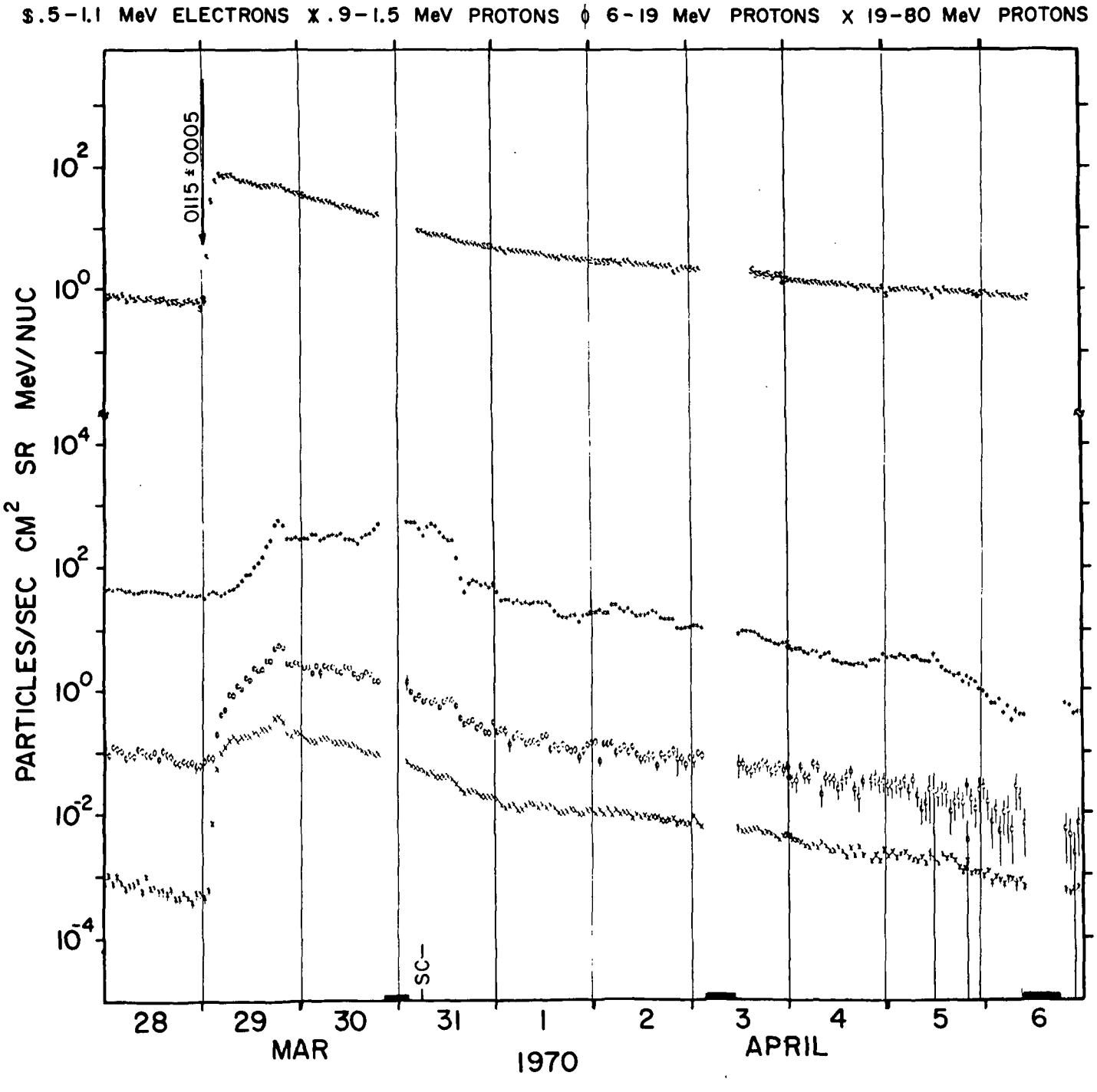
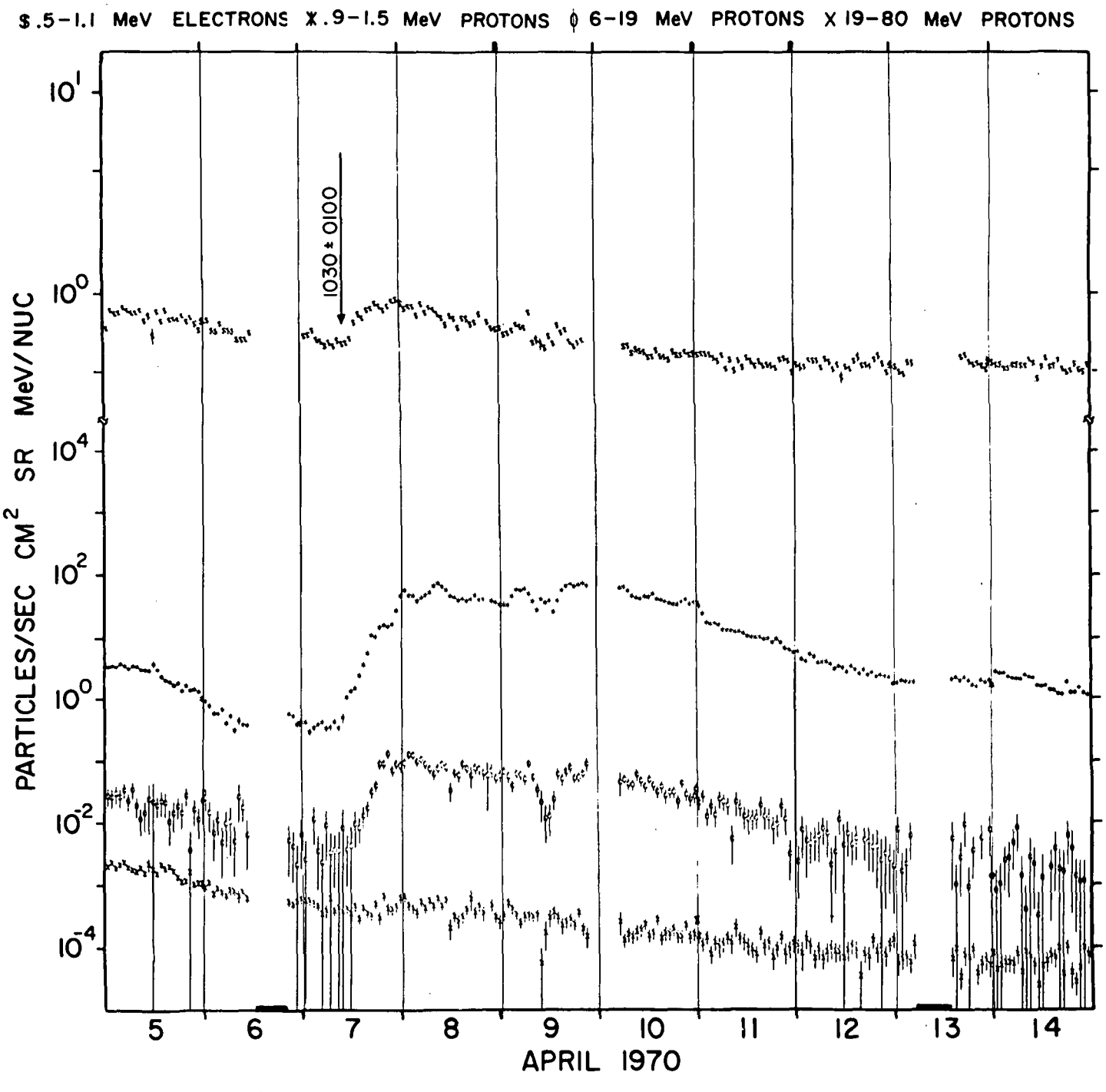
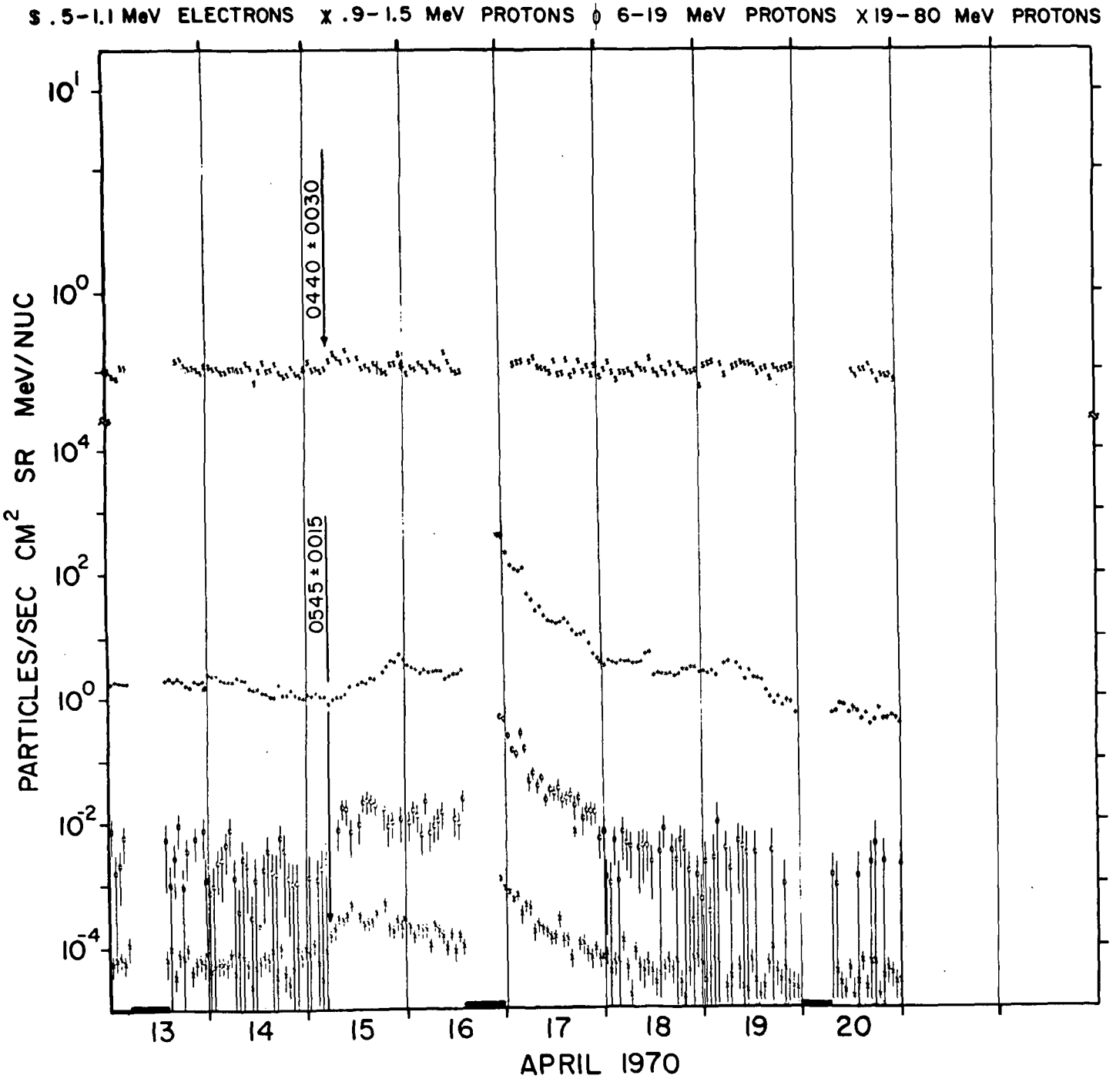
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁻¹
10⁻²
10⁻³
10⁻⁴
1245 ± 0015
1422±0003
15
16
17
18
25
26
27
28
FEB 1970

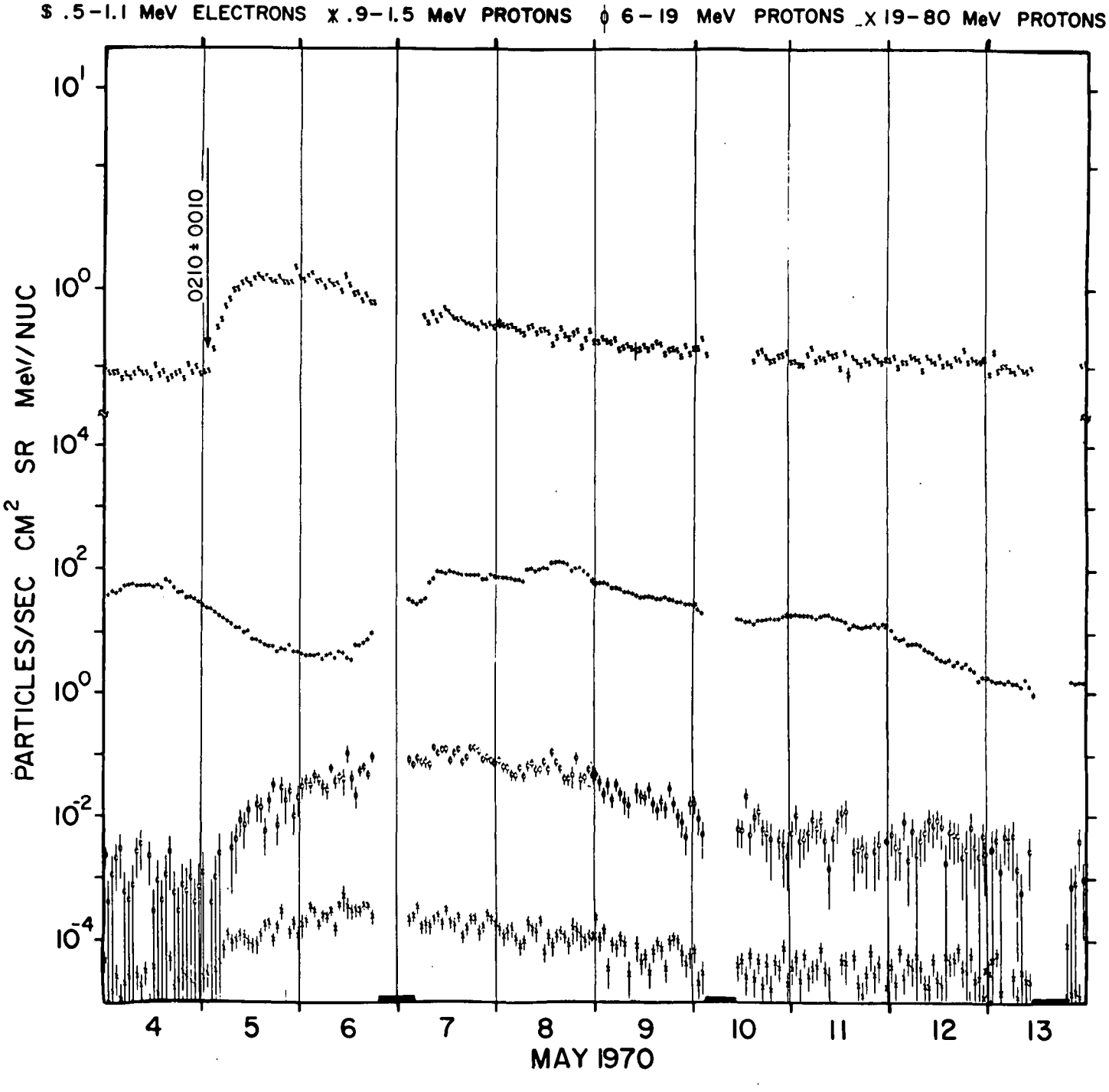

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1330 ± 0030
1100 ± 0200
0325 ± 0015
NOISE IN THE LED DETECTOR FOR THIS PERIOD
SC
SC
SC
4
5
6
7
8
9
10
11
12
13
MARCH 1970

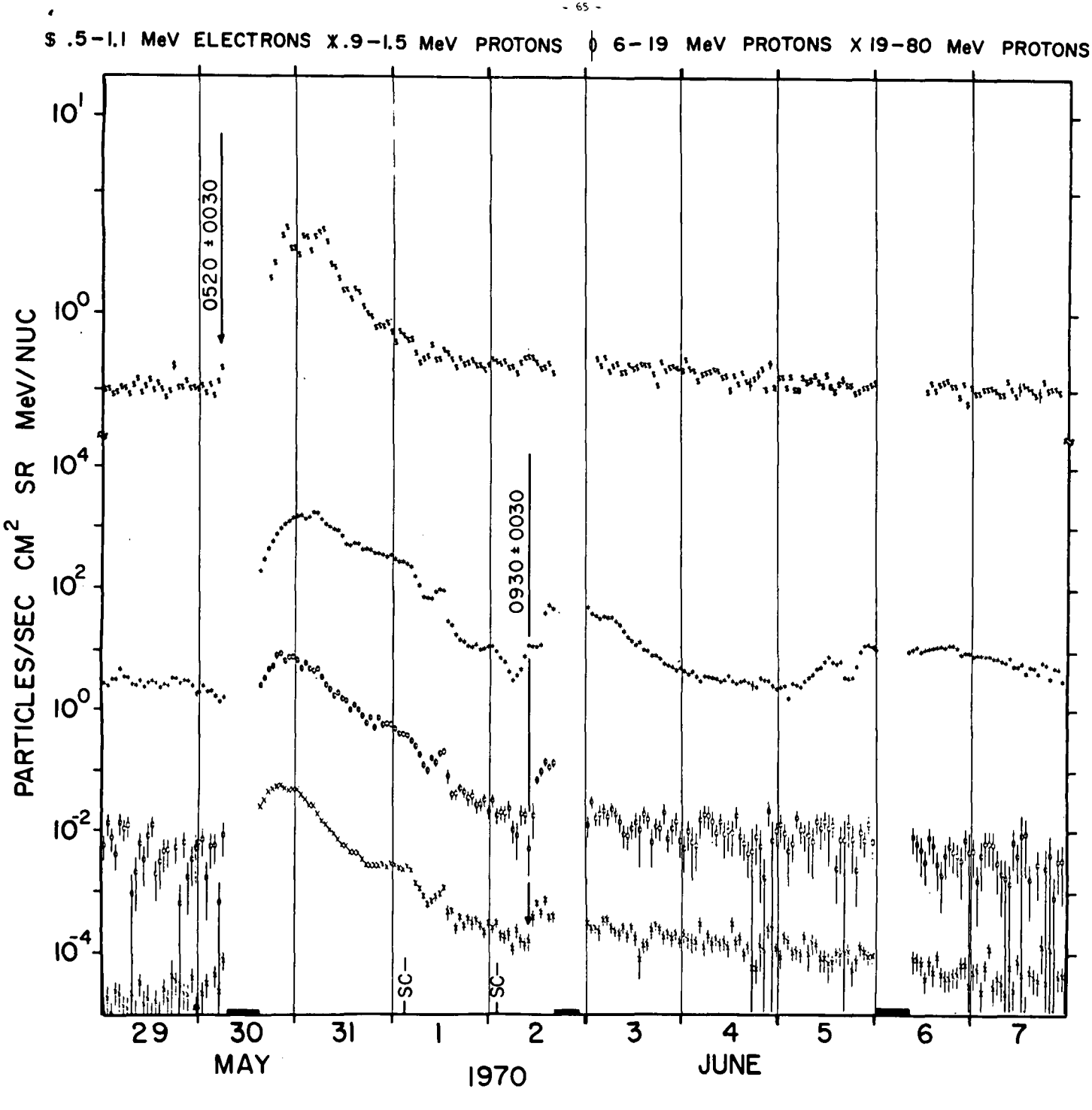

$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁻¹
10⁻²
10⁻³
10⁻⁴
1815 ± 0005
1400 ± 0100
0115 ± 0005
0730 ± 0100
SC
20
21
22
23
24
25
26
27
28
29
MAR 1970

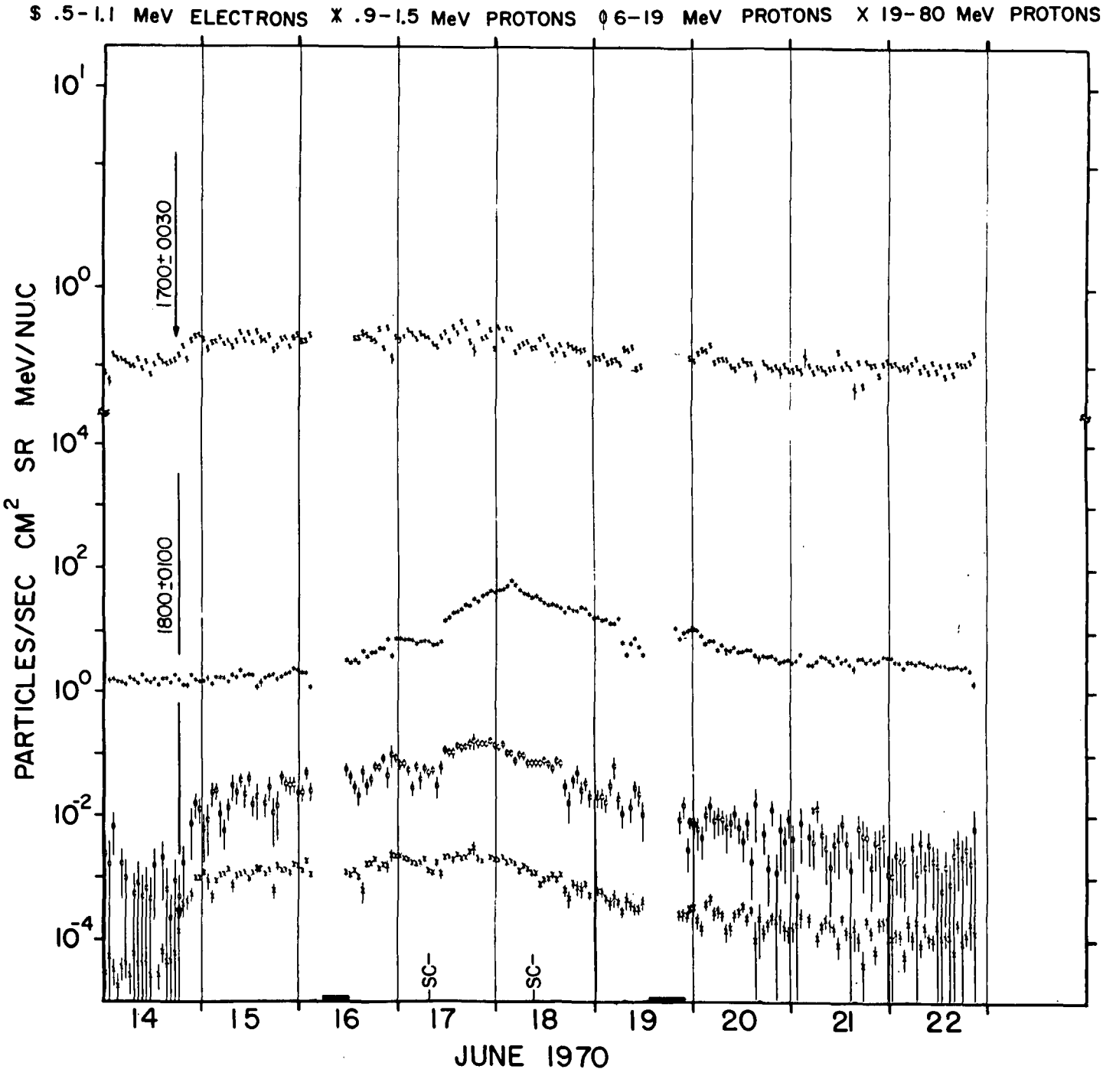

$.5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0115 ± 0005
SC
28
29
30
31
1
2
3
4
5
6
MAR
1970
APRIL

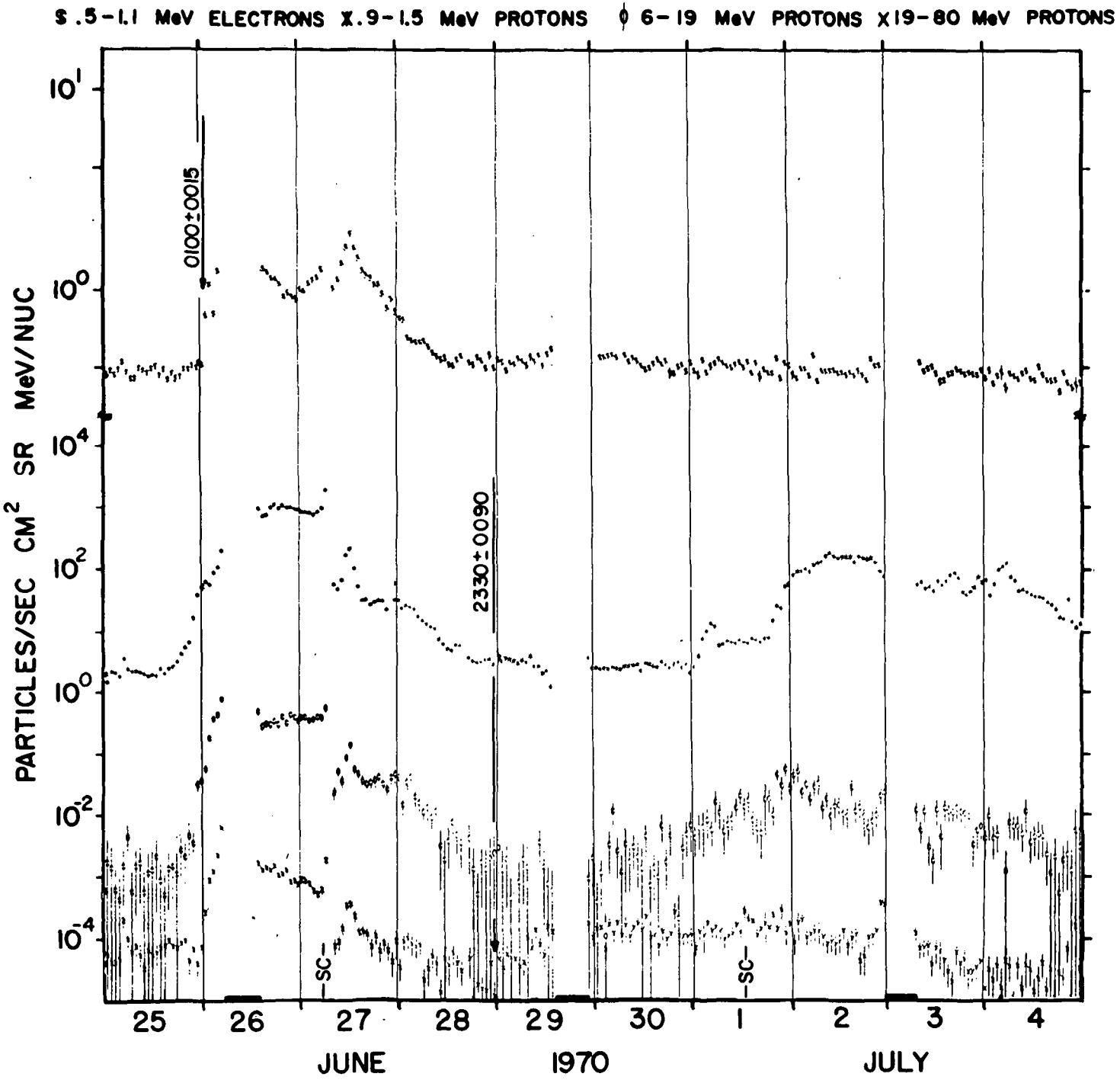

$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1030 ± 0100
5
6
7
8
9
10
11
12
13
14
APRIL 1970

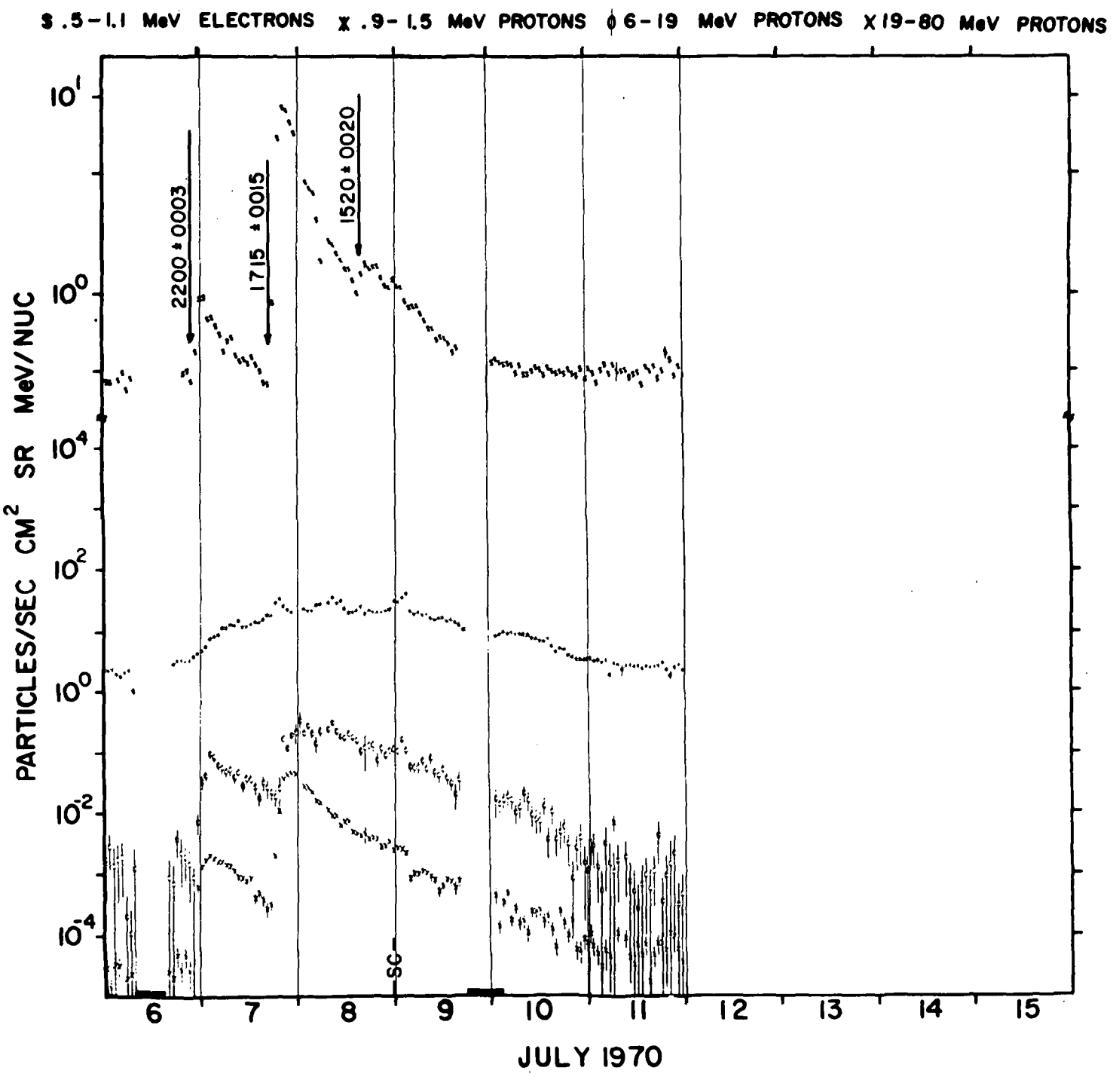

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁻¹
10⁻²
10⁻³
10⁻⁴
0440 ± 0030
0545 ± 0015
13
14
15
16
17
18
19
20
APRIL 1970

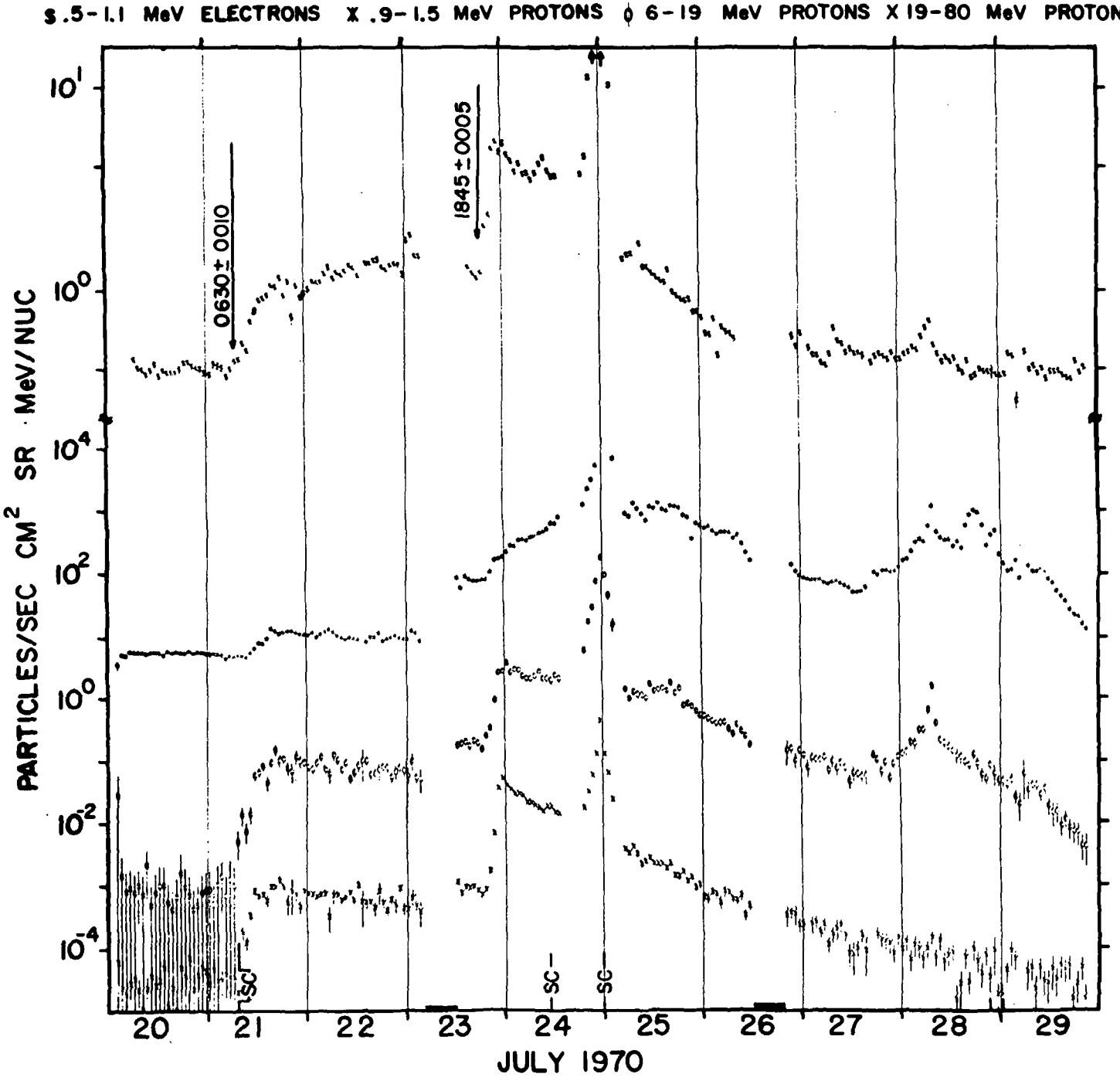

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0210 ± 0010
4
5
6
7
8
9
10
11
12
13
MAY 1970

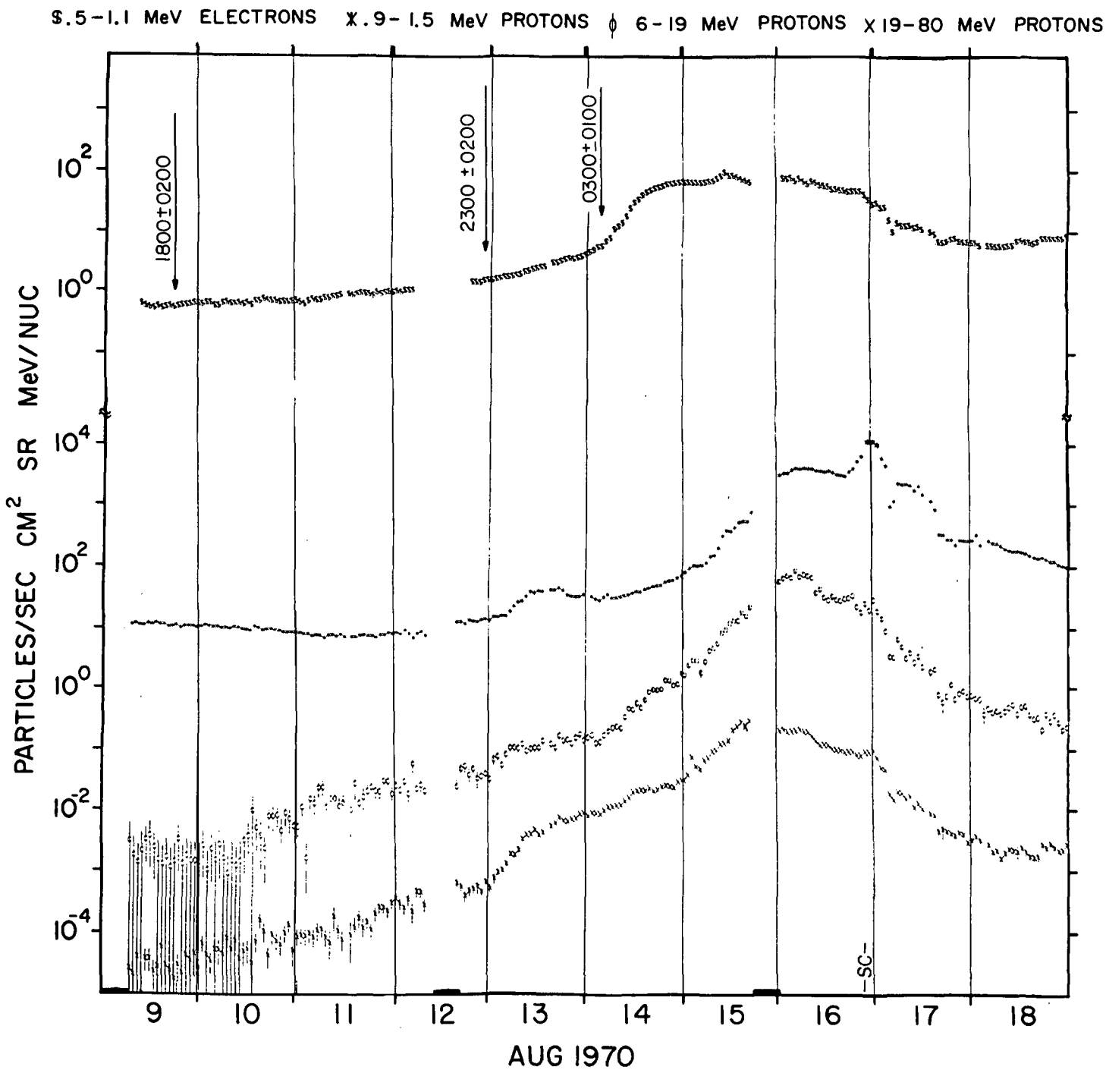

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0520 ± 0030
0930 ± 0030
SC-
SC-
29
30
31
1
2
3
4
5
6
7
MAY
1970
JUNE

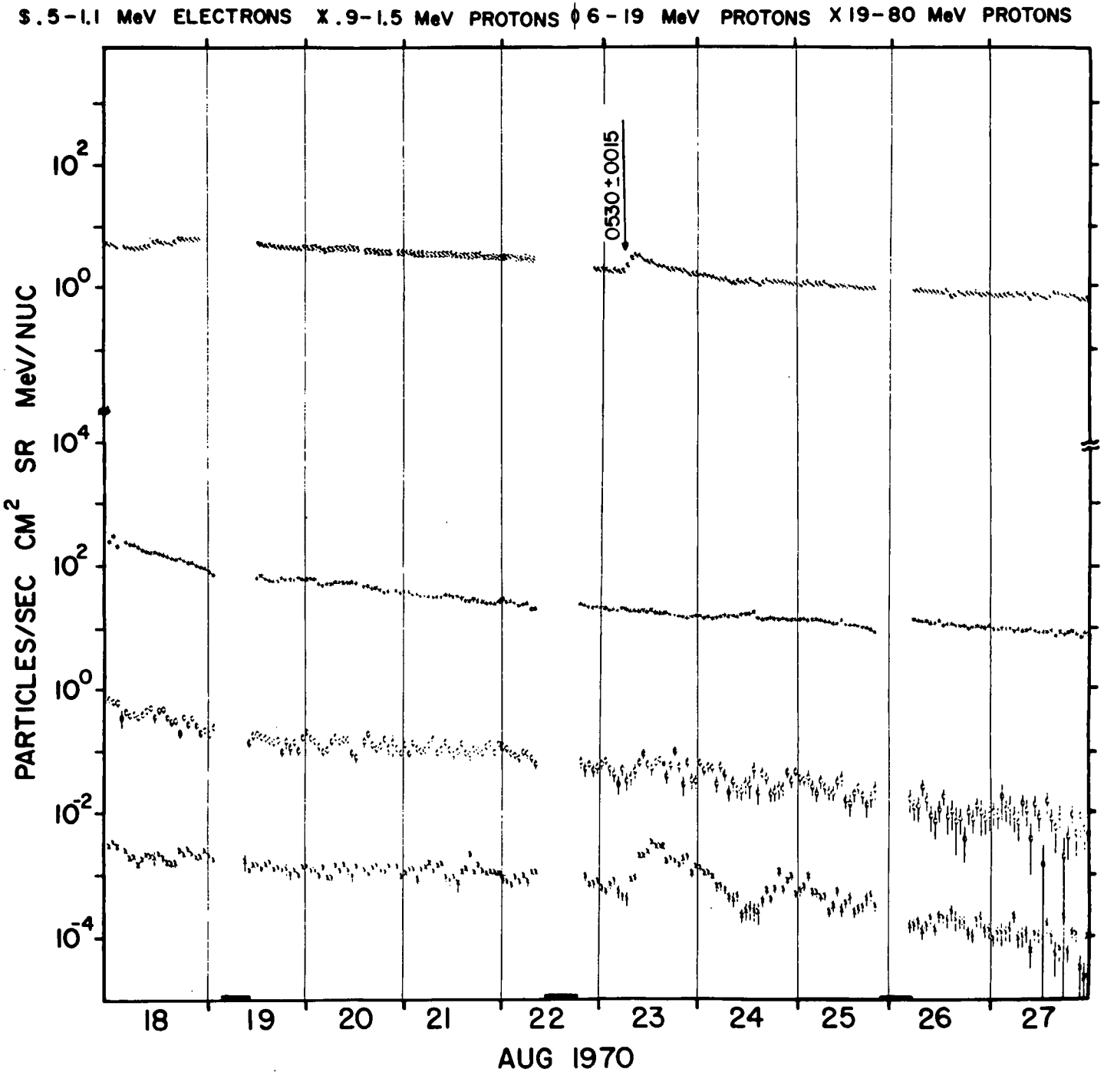

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1700±0030
1800±0100
SC-
SC-
14
15
16
17
18
19
20
21
22
JUNE 1970


$ .5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0100±0015
2330±0090
SC
SC
25
26
27
28
29
30
1
2
3
4
JUNE
1970
JULY


$ .5 - 1.1 MeV ELECTRONS
x .9 - 1.5 MeV PROTONS
ϕ 6 - 19 MeV PROTONS
X 19 - 80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2200 ± 0003
1715 ± 0015
1520 ± 0020
SC
6
7
8
9
10
11
12
13
14
15
JULY 1970


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR · MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0630±0010
1845±0005
SC
SC
SC
20
21
22
23
24
25
26
27
28
29
JULY 1970


$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
1800±0200
2300±0200
0300±0100
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
-SC-
9
10
11
12
13
14
15
16
17
18
AUG 1970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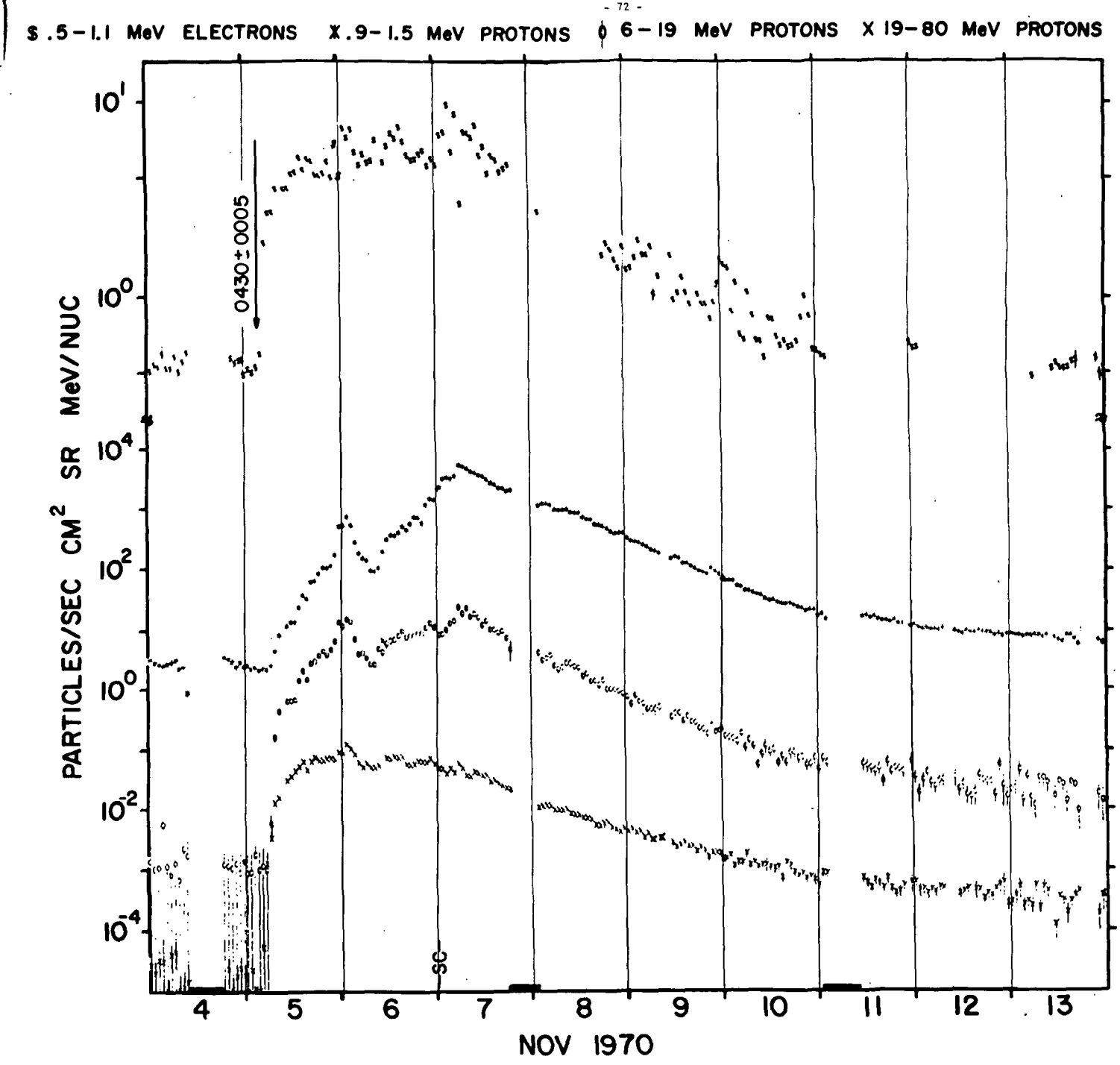
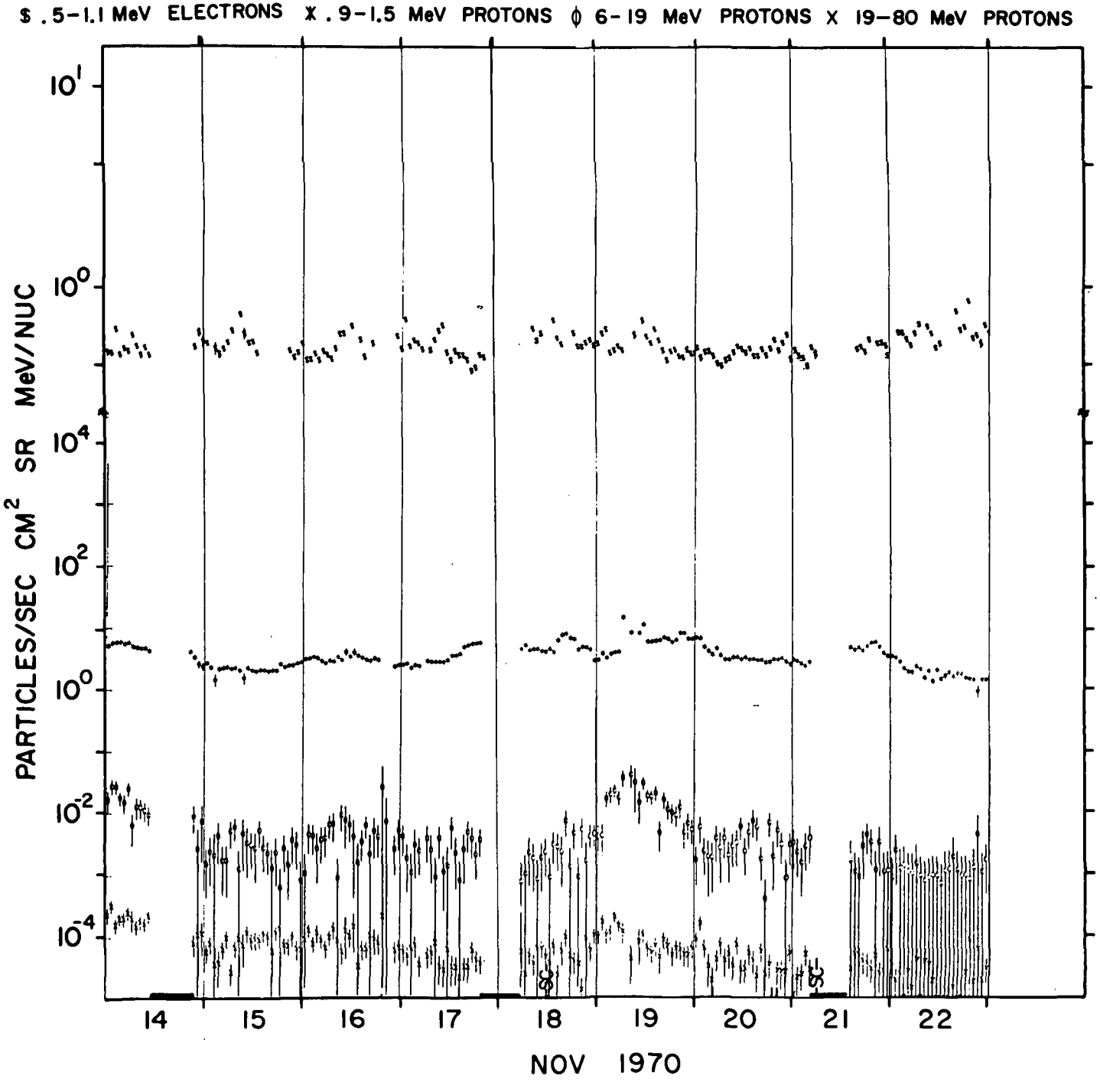
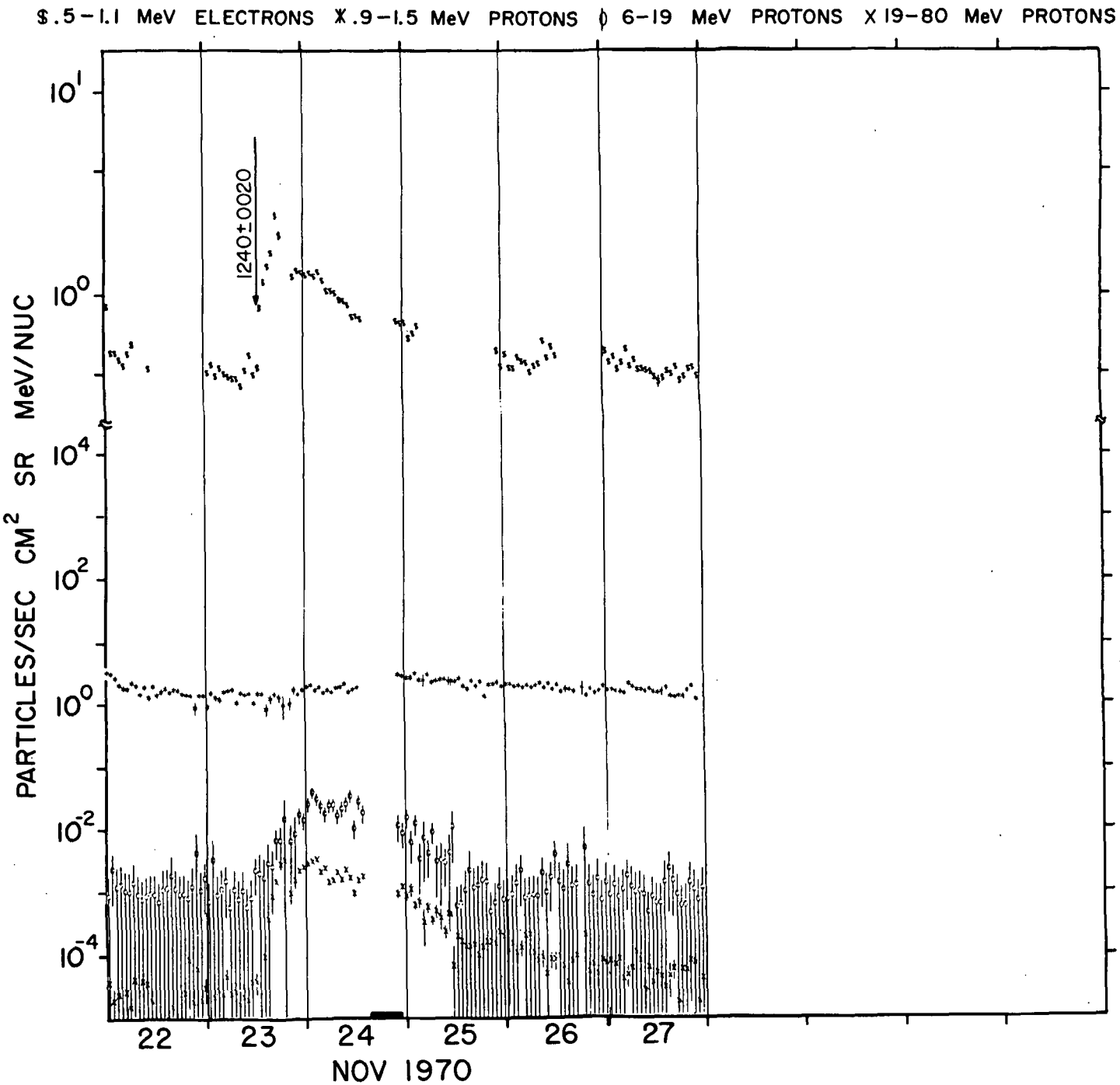
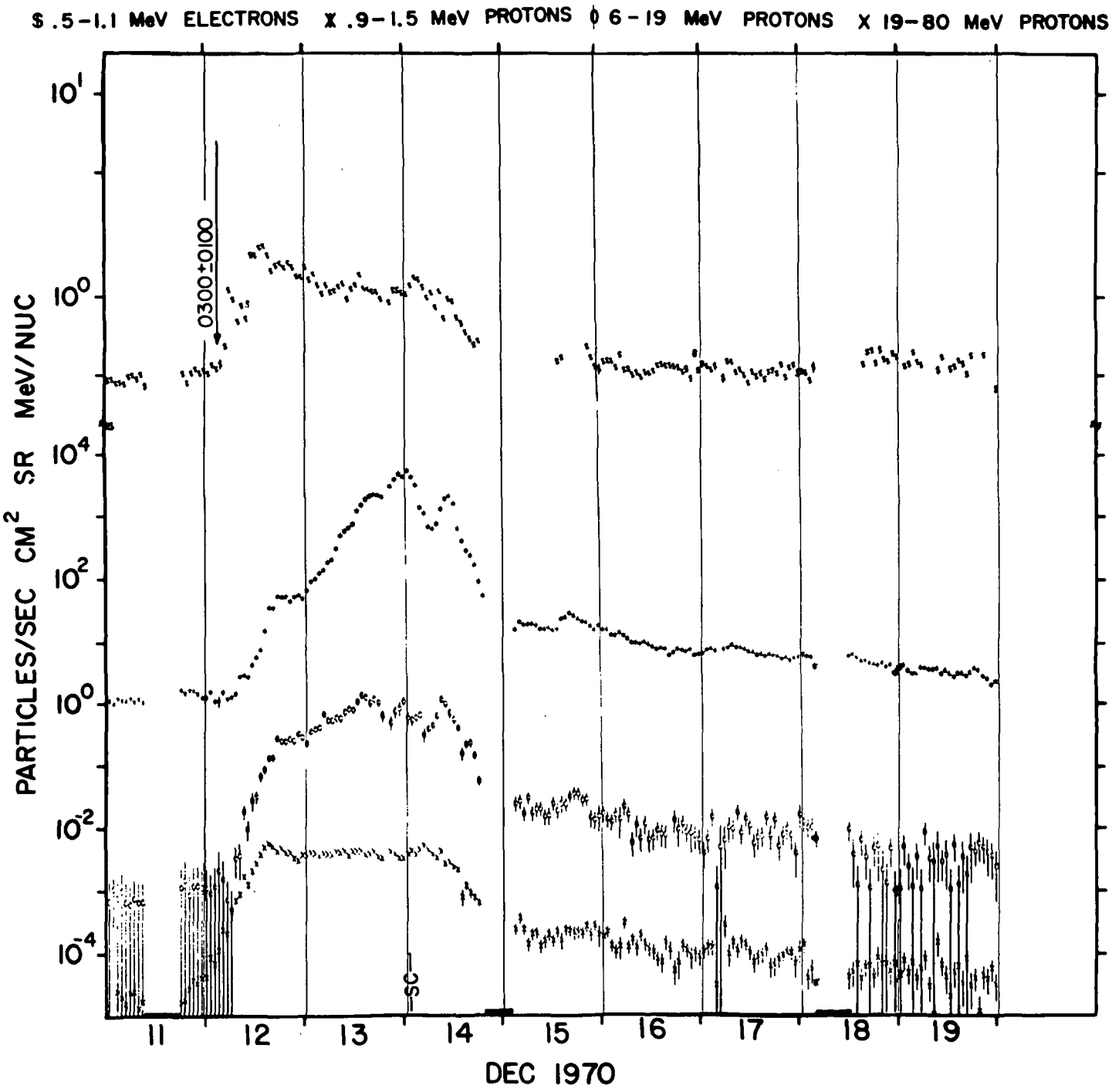
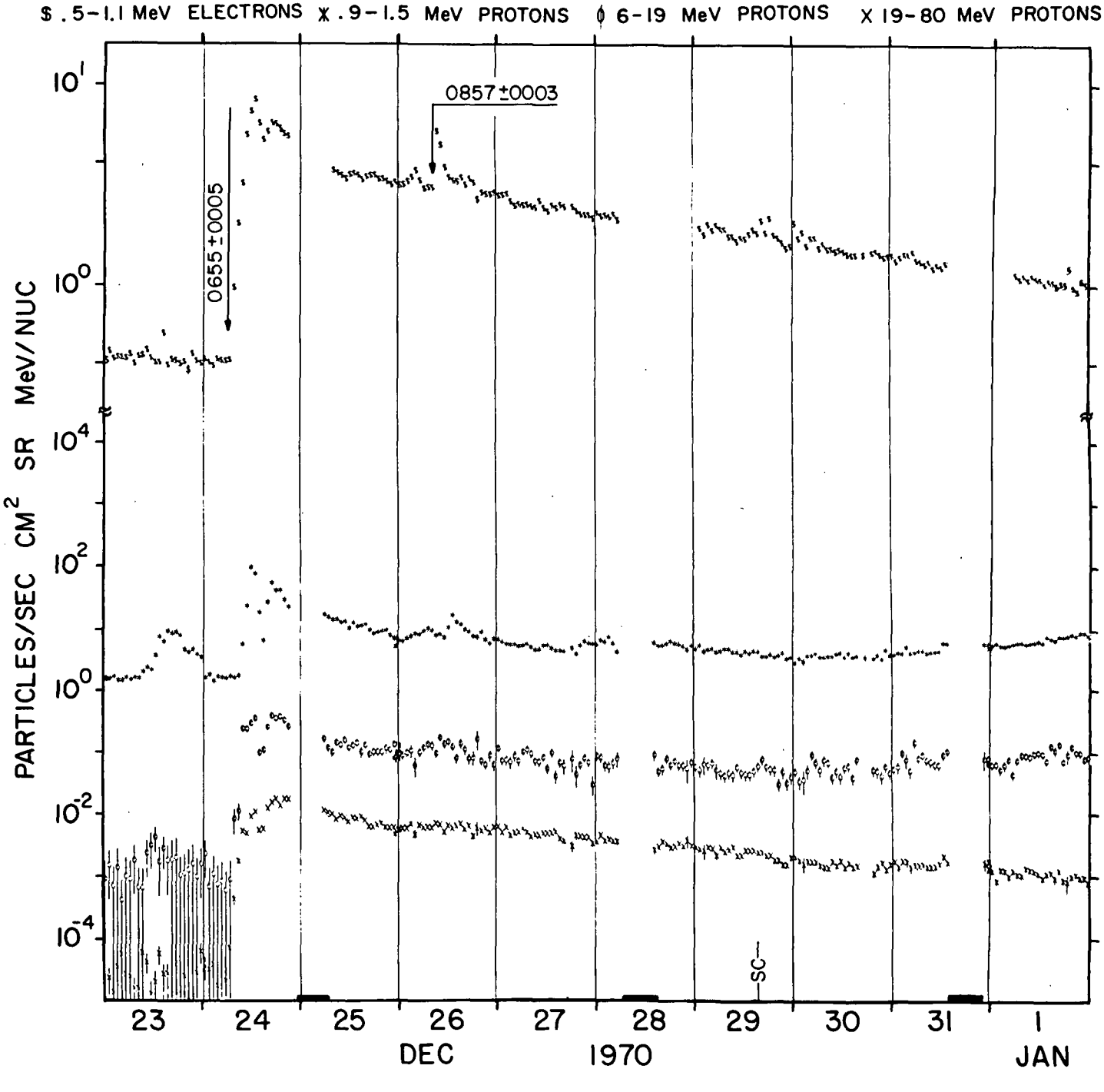
0530±0015
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
18
19
20
21
22
23
24
25
26
27
AUG 1970

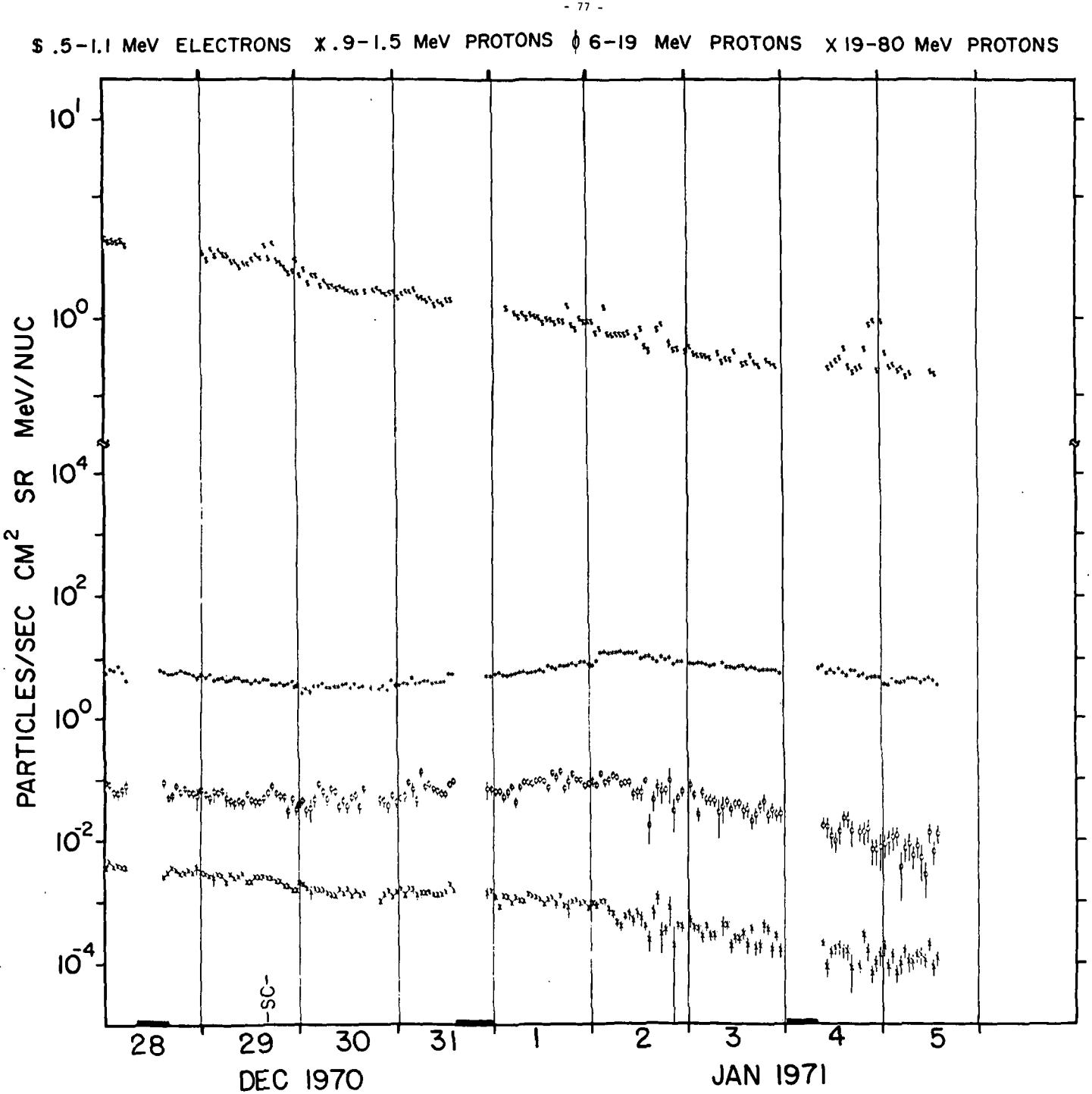

$ .5 – 1.1 MeV ELECTRONS X .9 – 1.5 MeV PROTONS ϕ 6 – 19 MeV PROTONS X 19 – 80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0430±0005
SC
4
5
6
7
8
9
10
11
12
13
NOV 1970

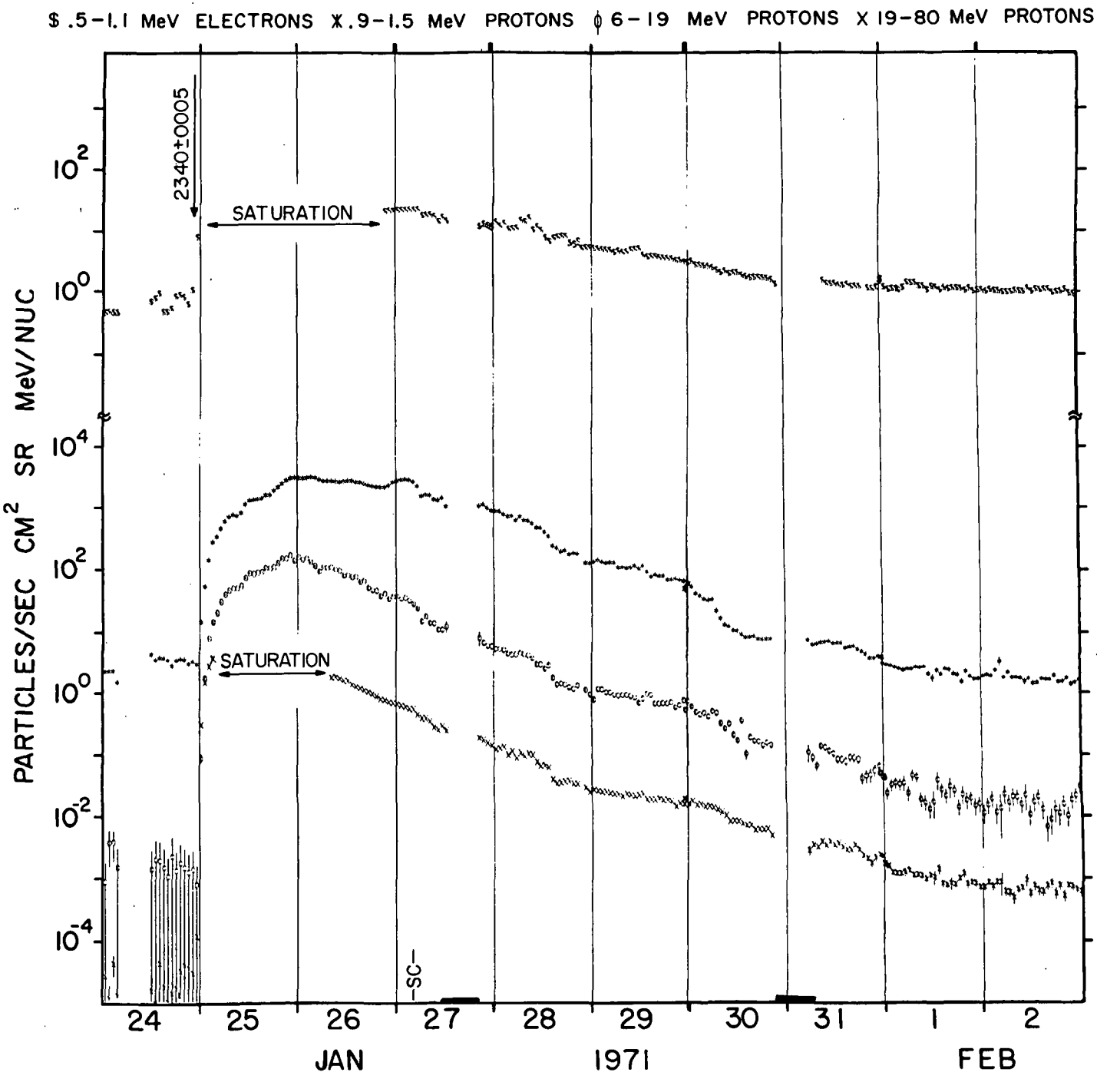

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
SC
14
15
16
17
18
19
20
21
22
NOV 1970

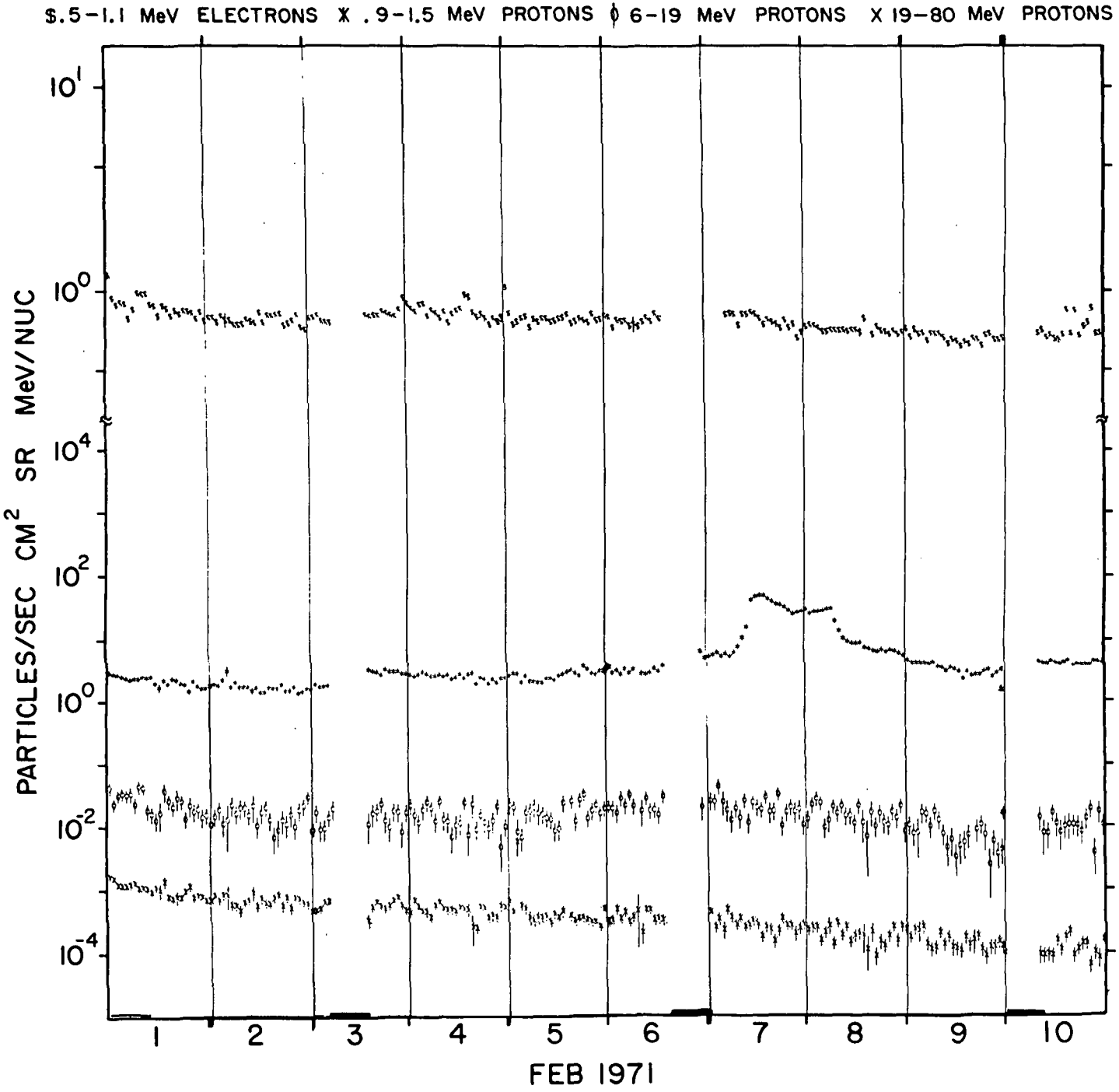

$.5-1.1 MeV ELECTRONS X.9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1240±0020
22
23
24
25
26
27
NOV 1970

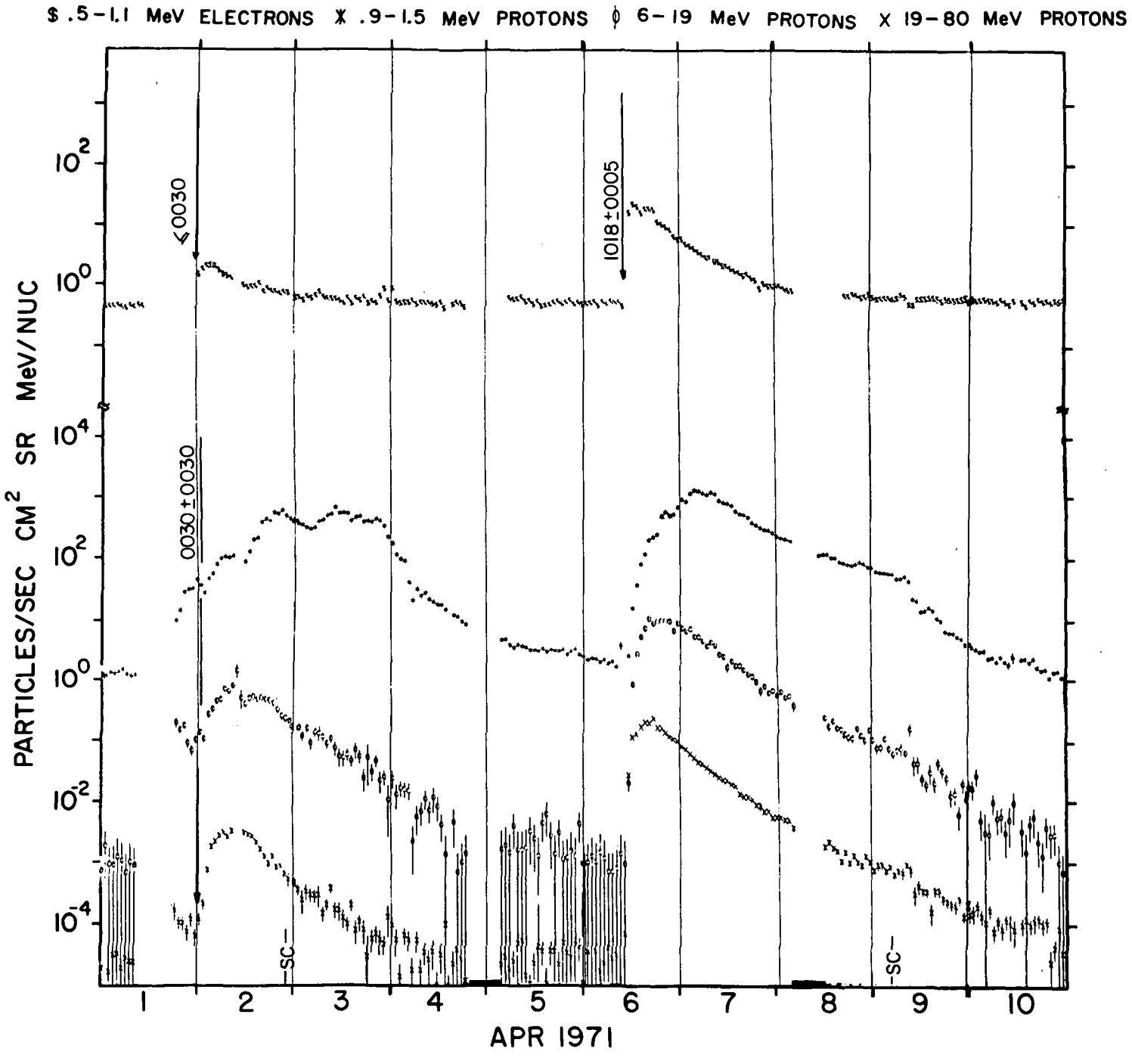

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0300±0100
SC
11
12
13
14
15
16
17
18
19
DEC 1970

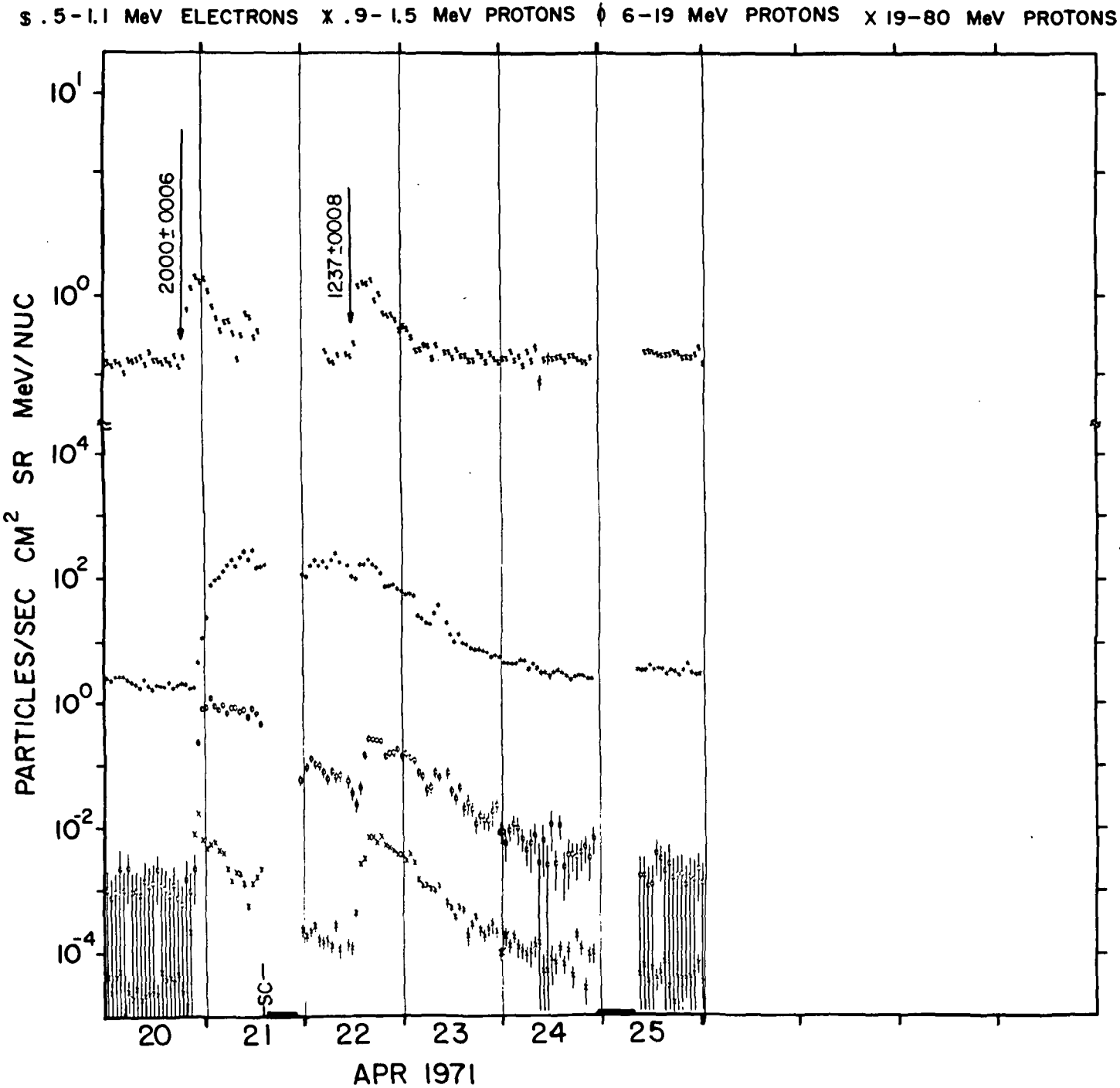

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM2 SR MeV/NUC
10^1
10^0
10^-2
10^-4
0655±0005
0857±0003
SC
23
24
25
26
27
28
29
30
31
1
DEC
1970
JAN

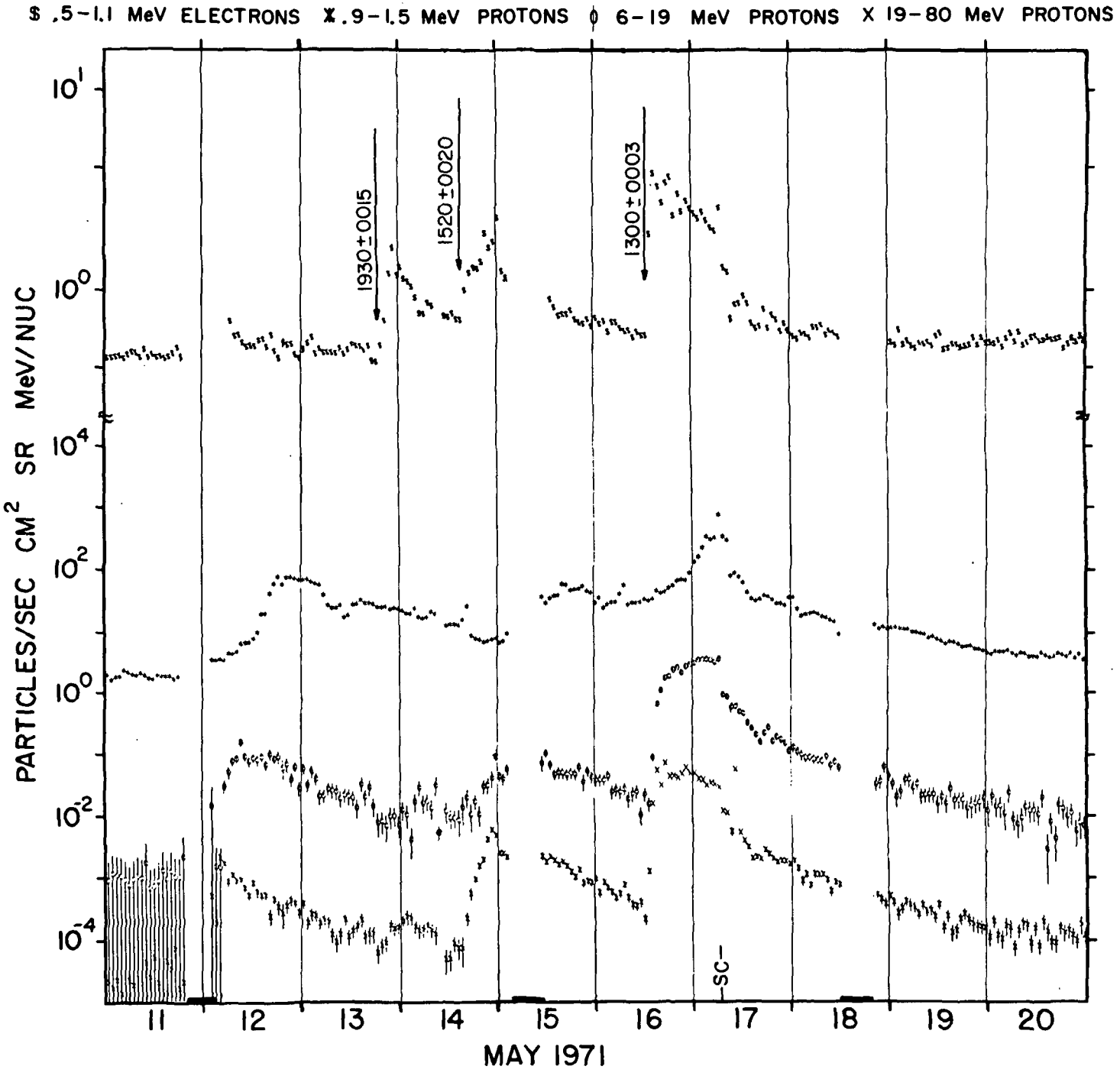

$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
-SC-
28
29
30
31
1
2
3
4
5
DEC 1970
JAN 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
2340±0005
SATURATION
SATURATION
-SC-
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
24
25
26
27
28
29
30
31
1
2
JAN
1971
FEB


$.5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1
2
3
4
5
6
7
8
9
10
FEB 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
≤0030
0030±0030
1018±0005
SC
SC
1
2
3
4
5
6
7
8
9
10
APR 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2000±0006
1237±0008
SC
20
21
22
23
24
25
APR 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1930±0015
1520±0020
1300±0003
SC
11
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13
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15
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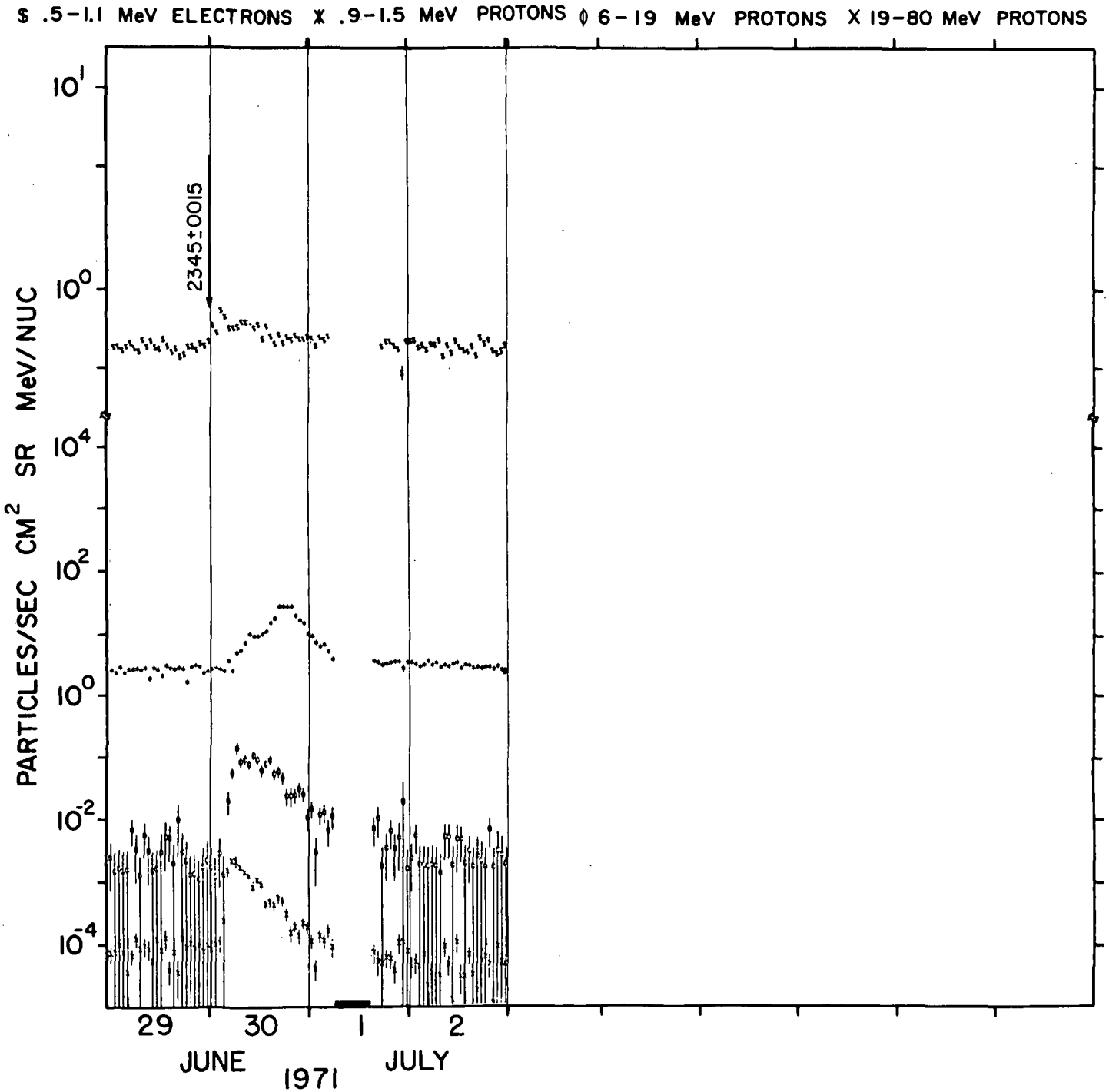
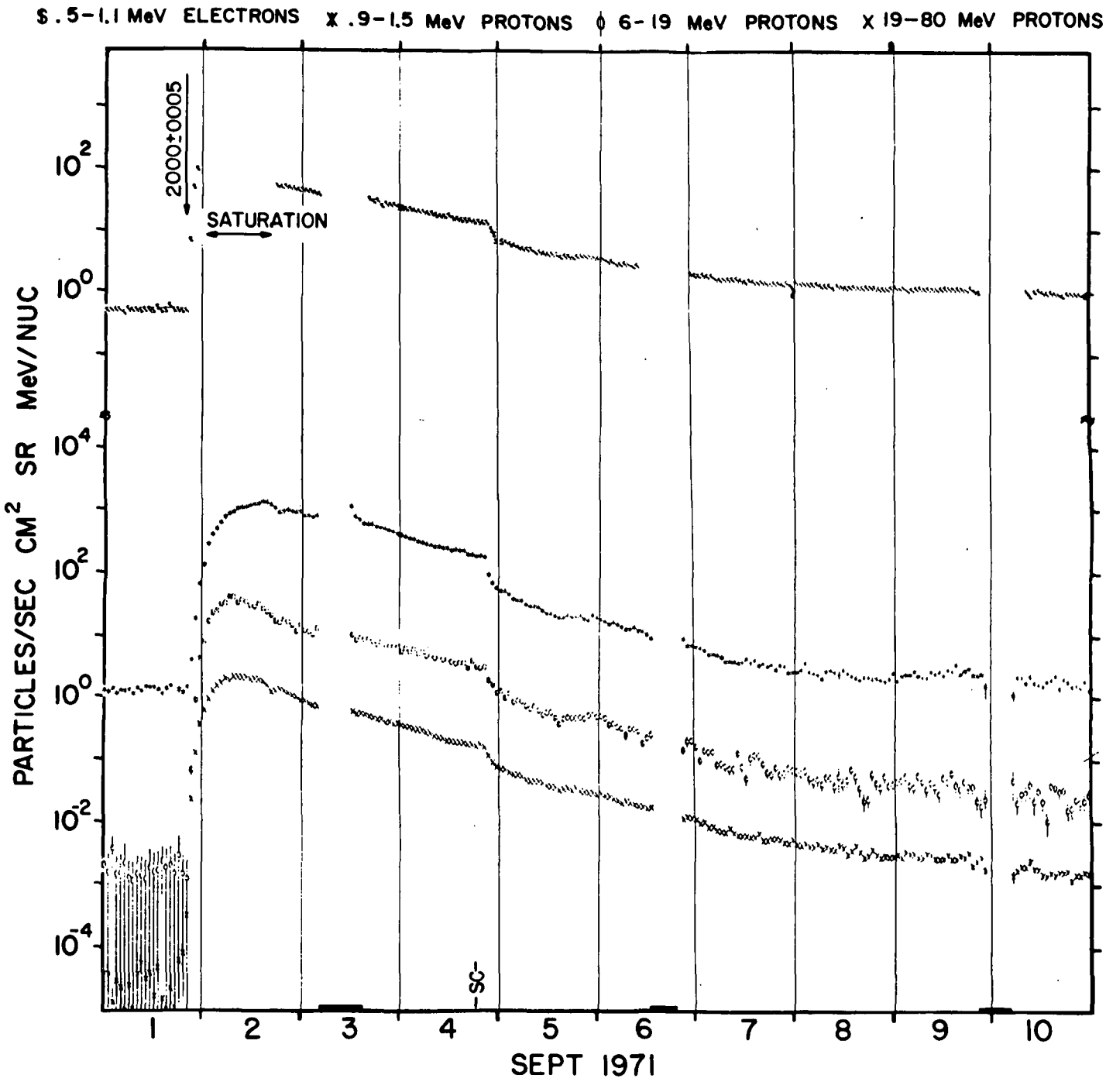
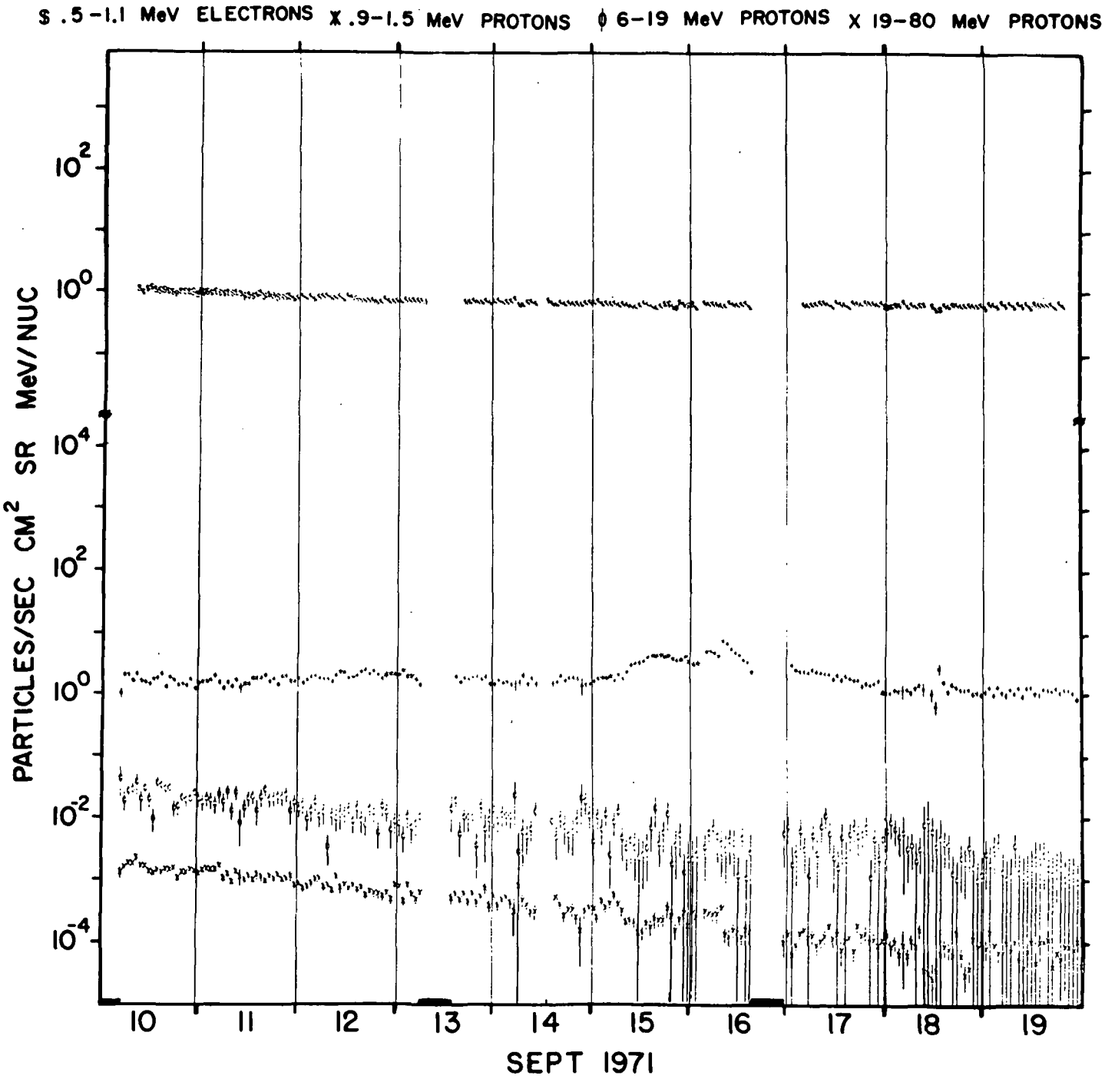
19
20
MAY 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ◊ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2345±0015
29
30
1
2
JUNE
1971
JULY


$ .5-1.1 MeV ELECTRONS
x .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
2000±0005
SATURATION
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
-SC-
1
2
3
4
5
6
7
8
9
10
SEPT 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
10
11
12
13
14
15
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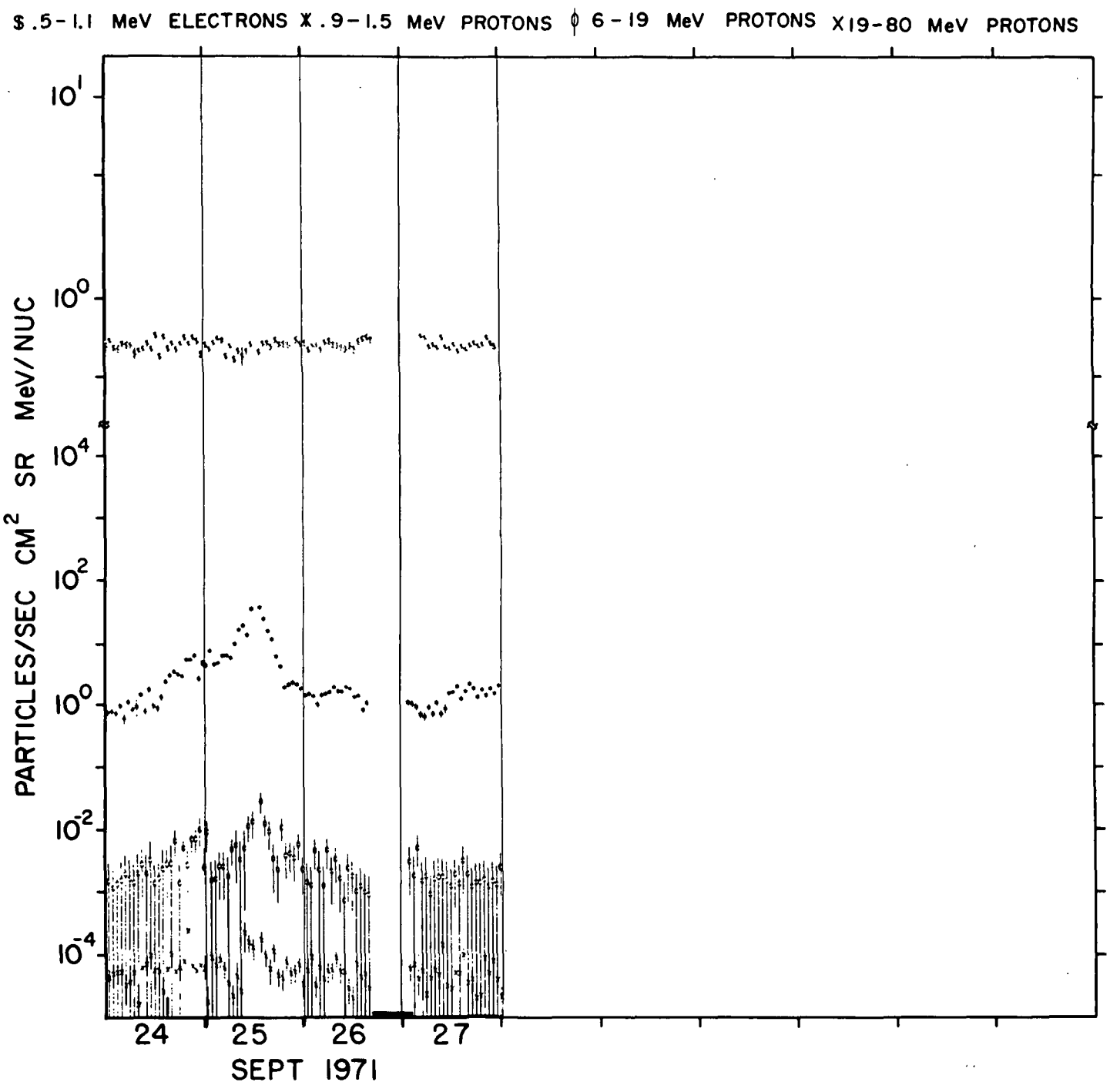
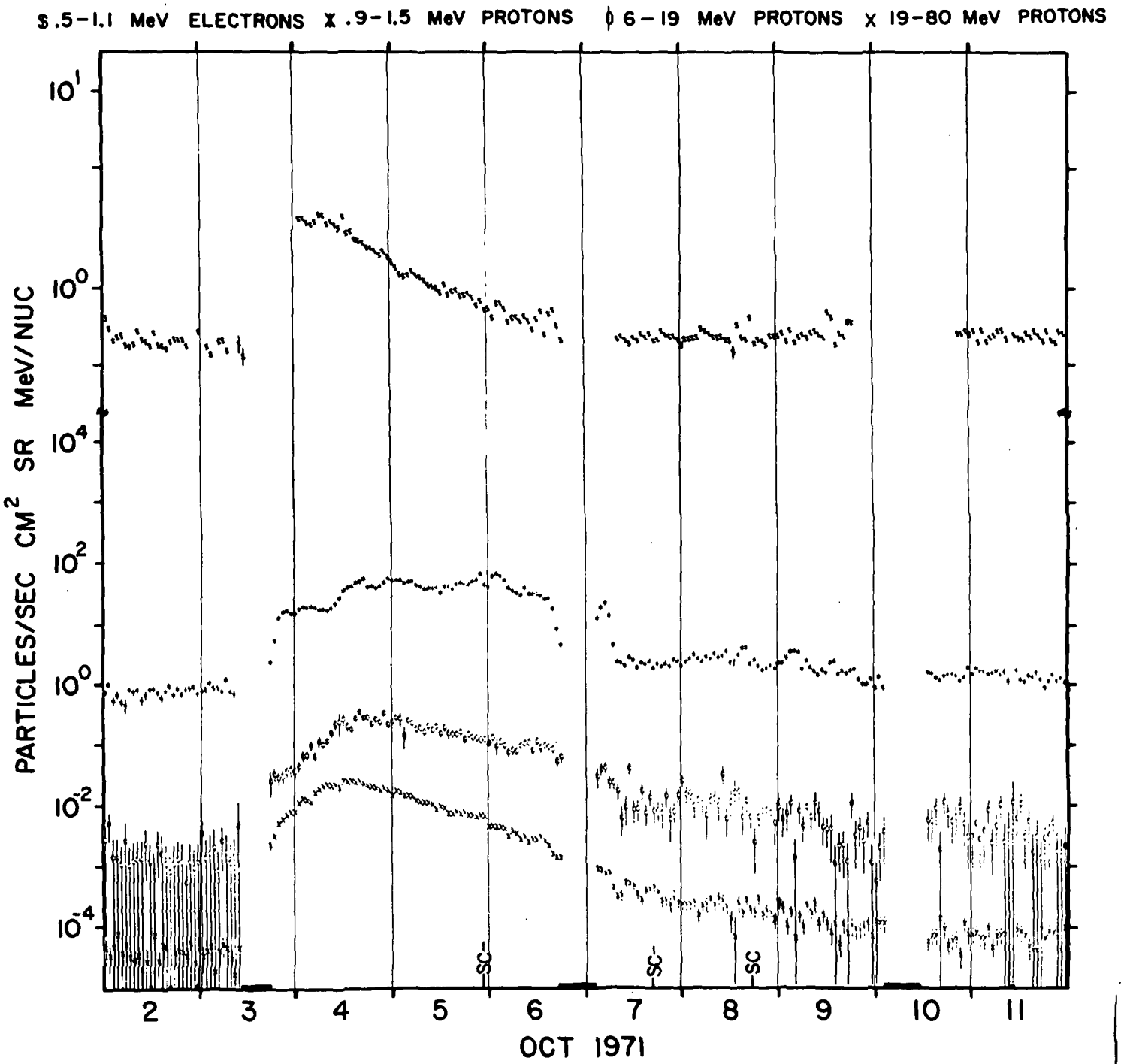
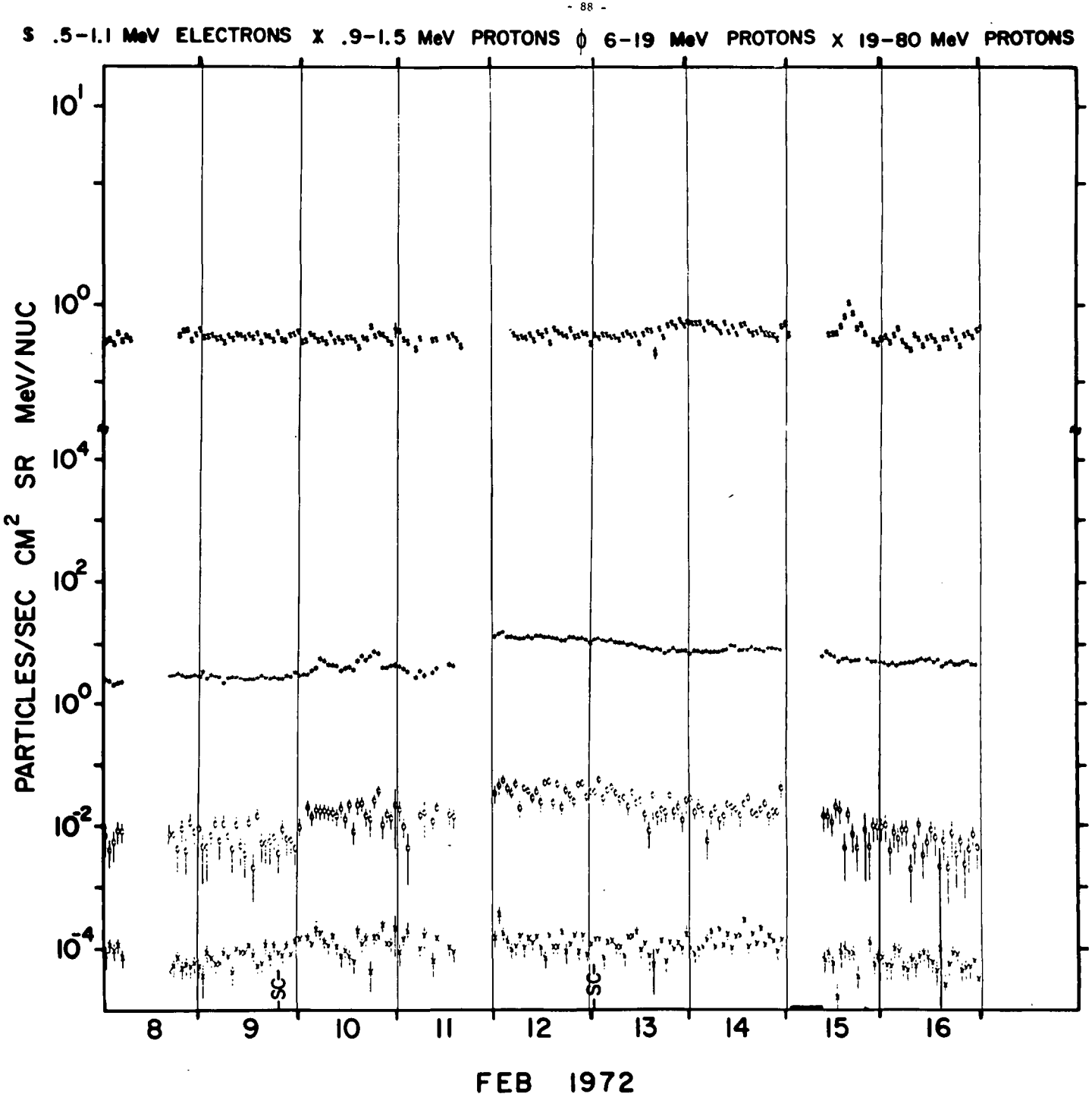
17
18
19
SEPT 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
24
25
26
27
SEPT 1971


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC-
SC-
SC
2
3
4
5
6
7
8
9
10
11
OCT 1971


S .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
SC
8
9
10
11
12
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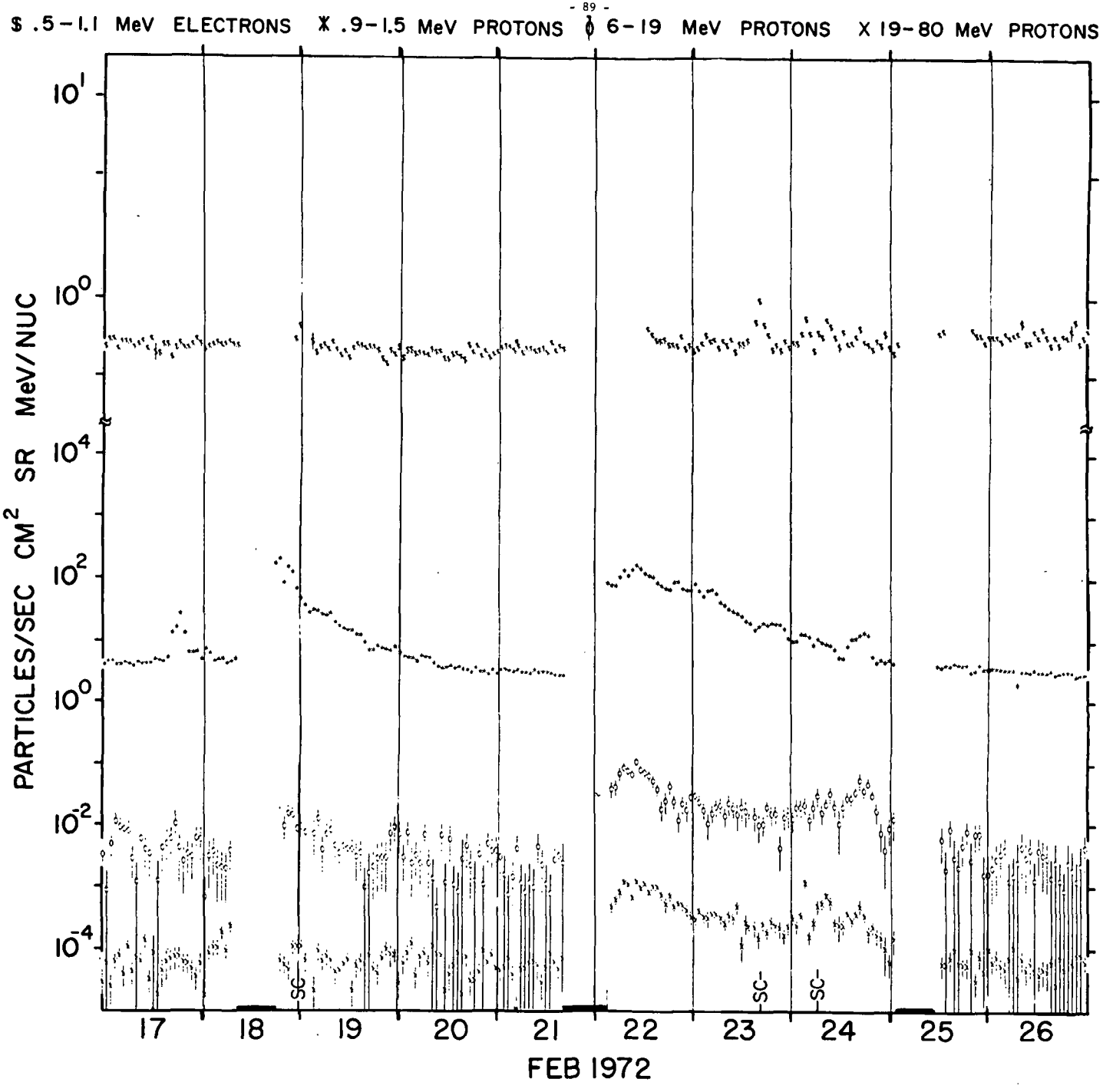
14
15
16
FEB 1972


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
SC
SC
17
18
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20
21
22
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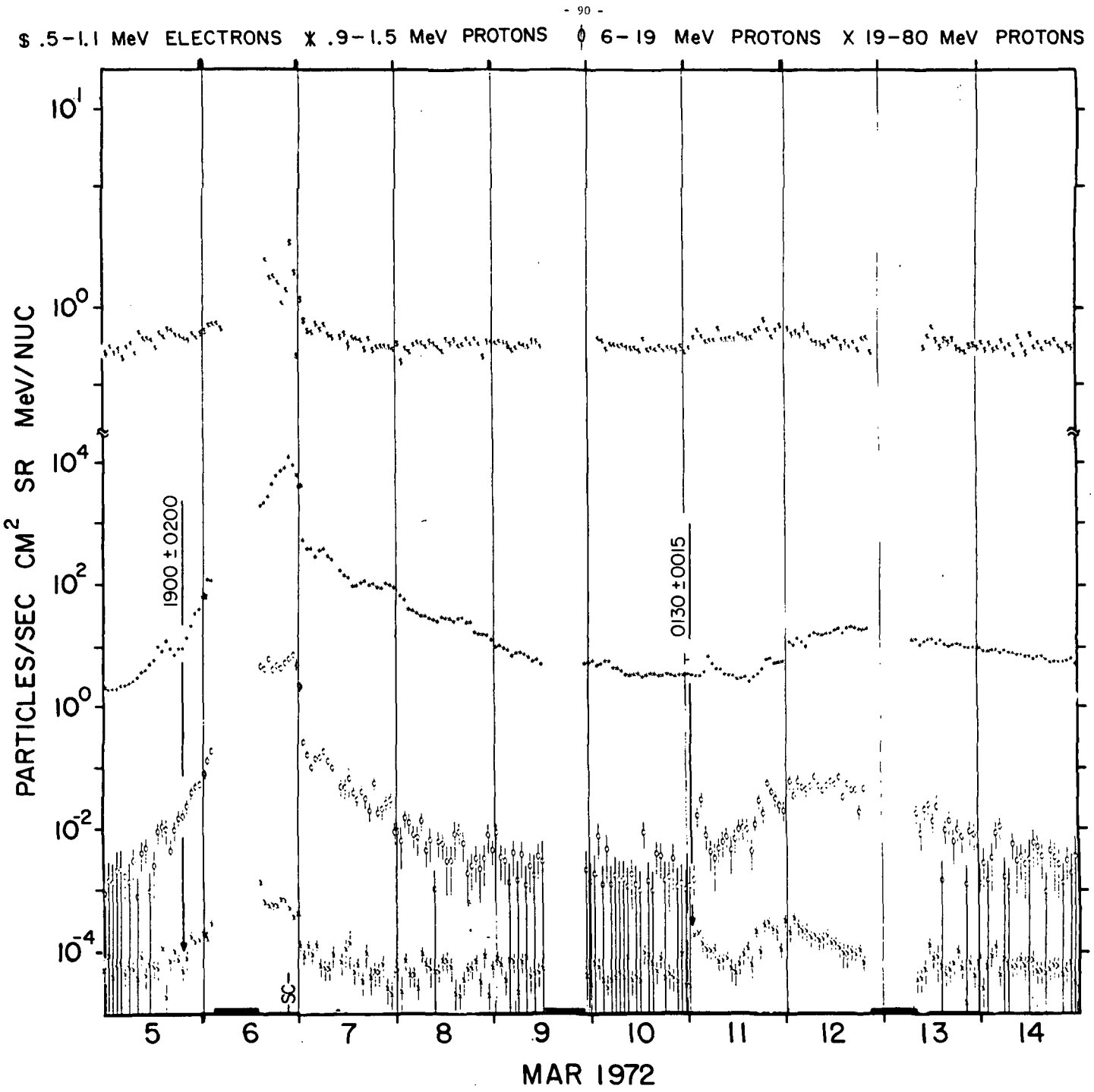
24
25
26
FEB 1972


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1900 ± 0200
0130 ± 0015
SC
5
6
7
8
9
10
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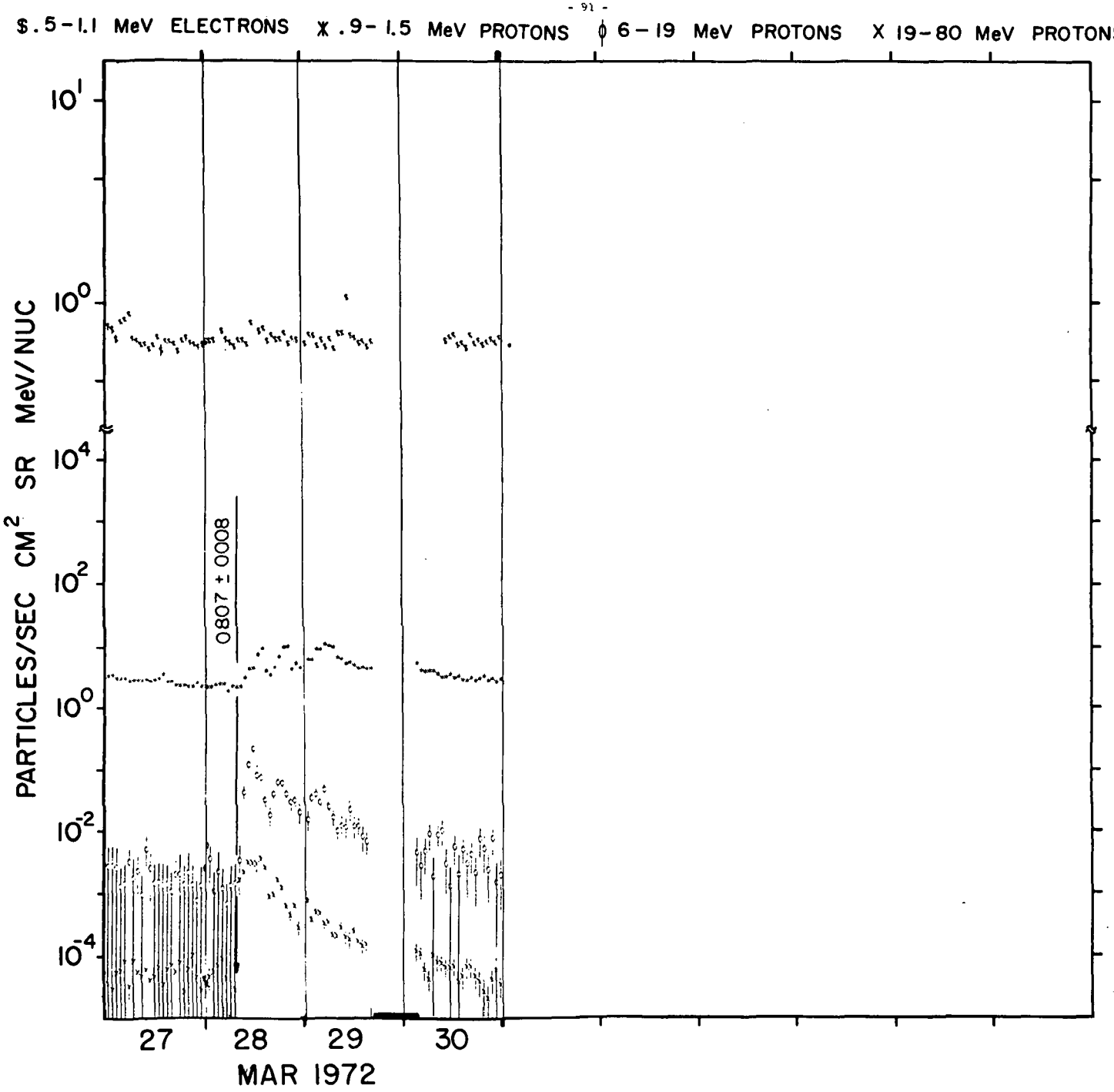
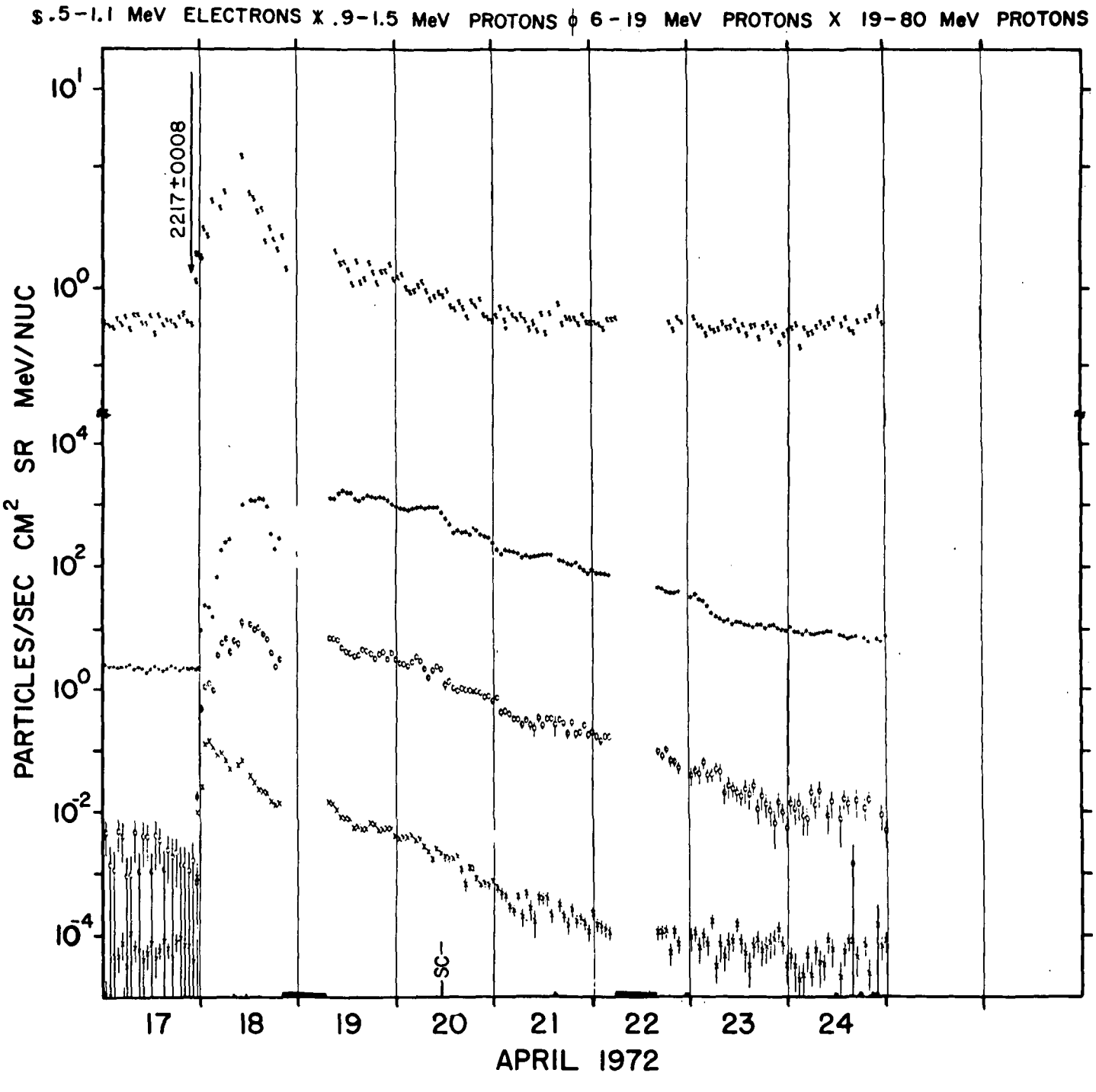
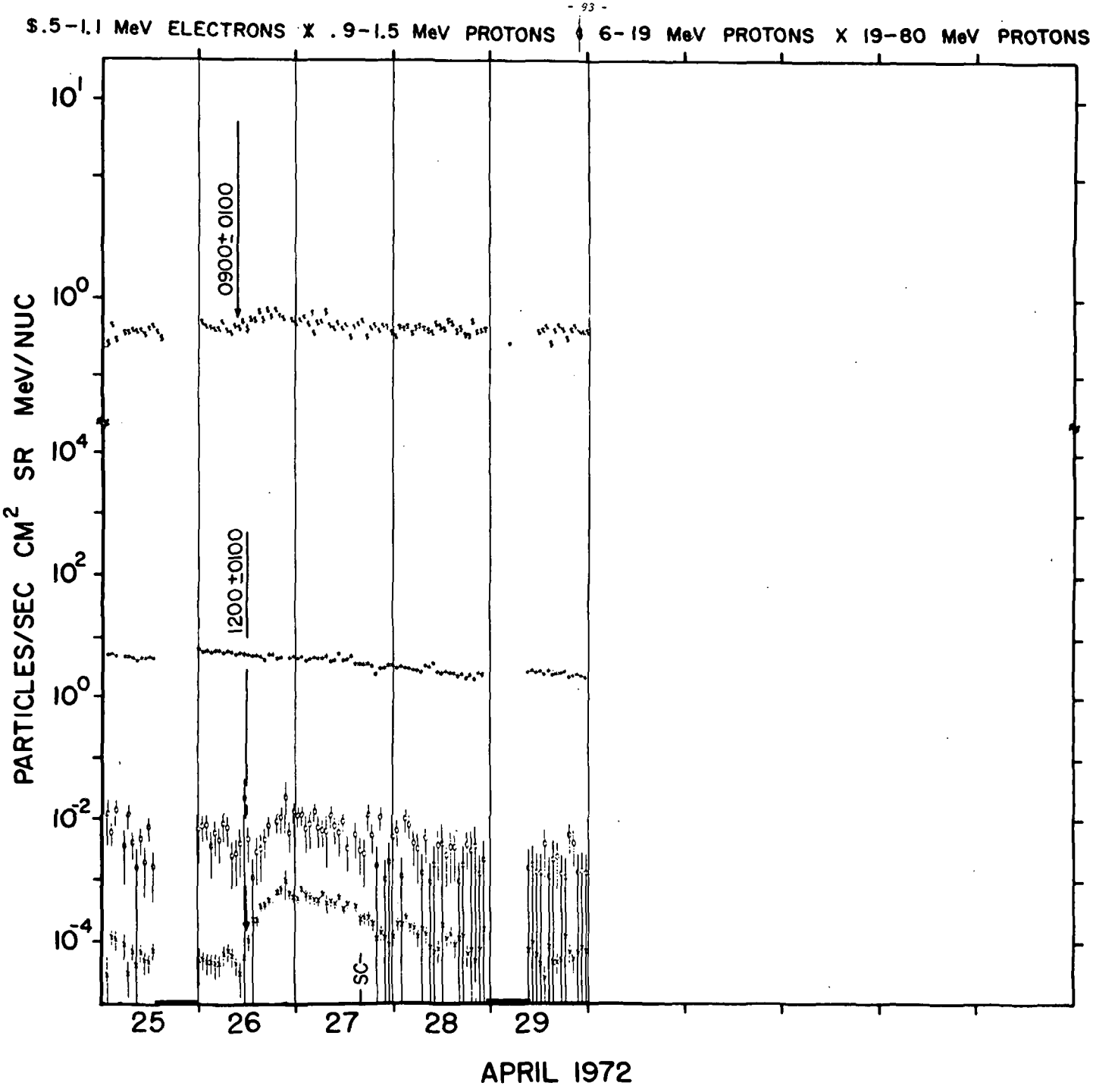
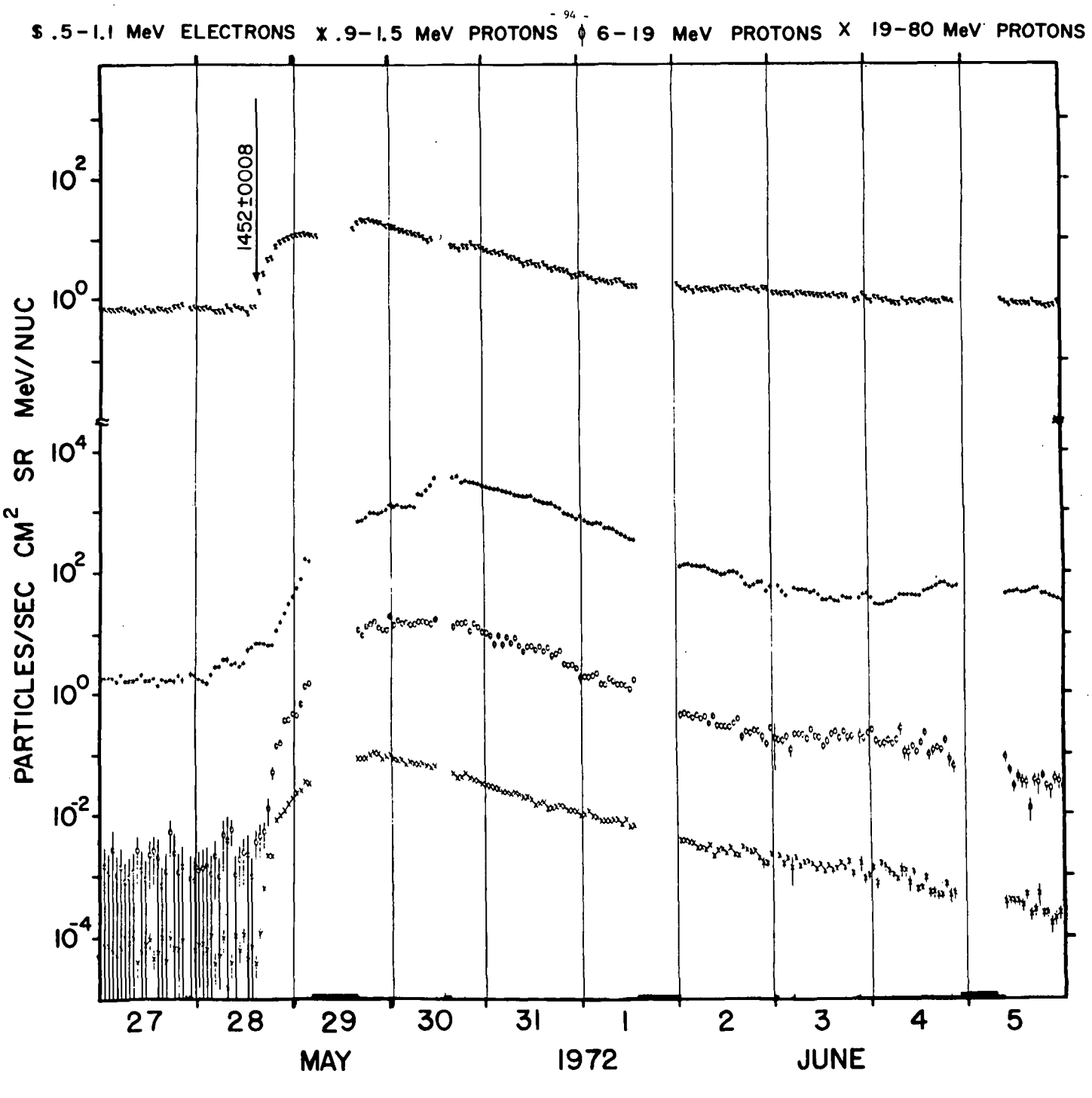
12
13
14
MAR 1972


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0807 ± 0008
27
28
29
30
MAR 1972


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2217±0008
SC
17
18
19
20
21
22
23
24
APRIL 1972


.5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0900±0060
1200±0100
SC
25
26
27
28
29
APRIL 1972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1452±0008
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
27
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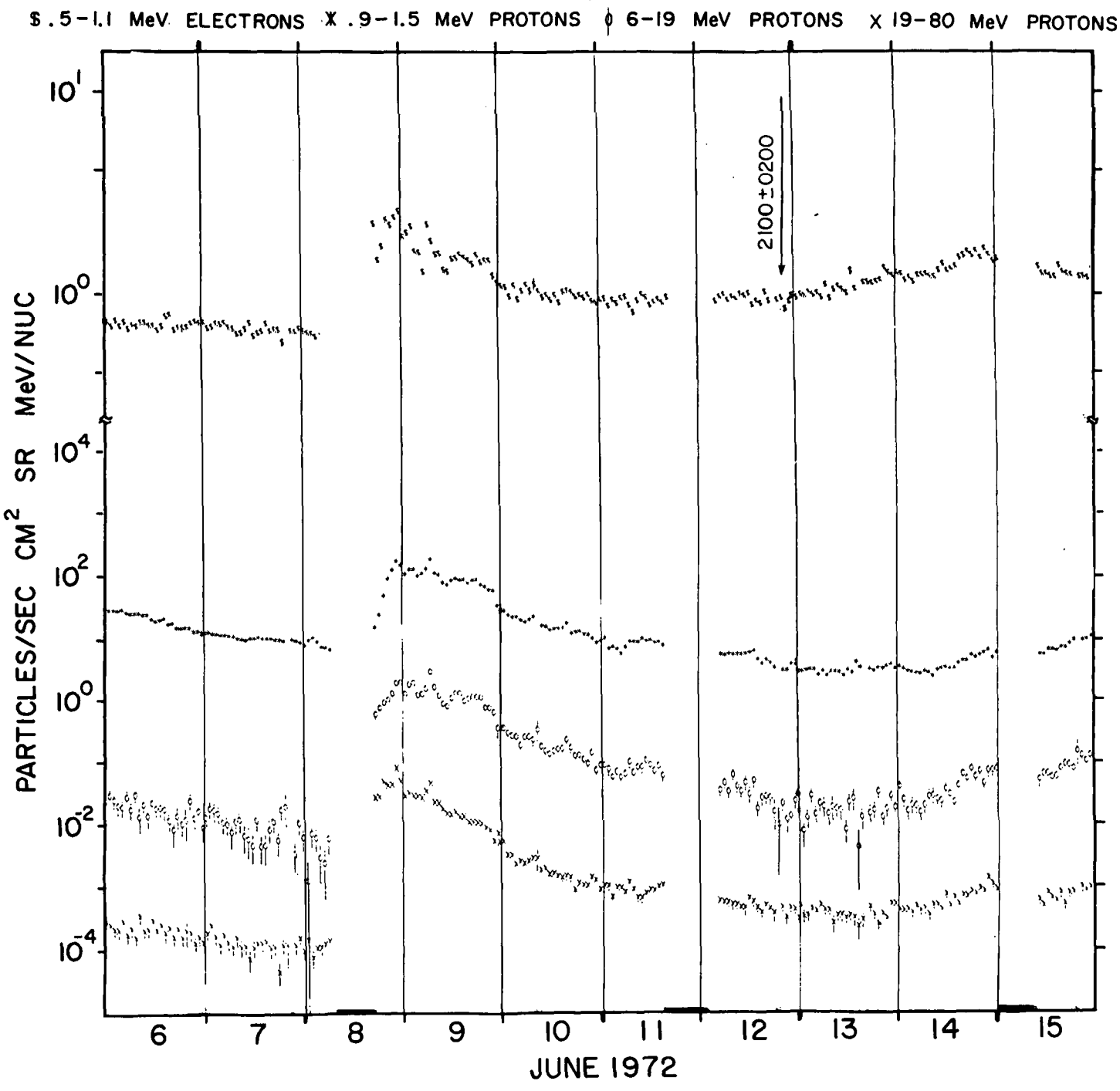
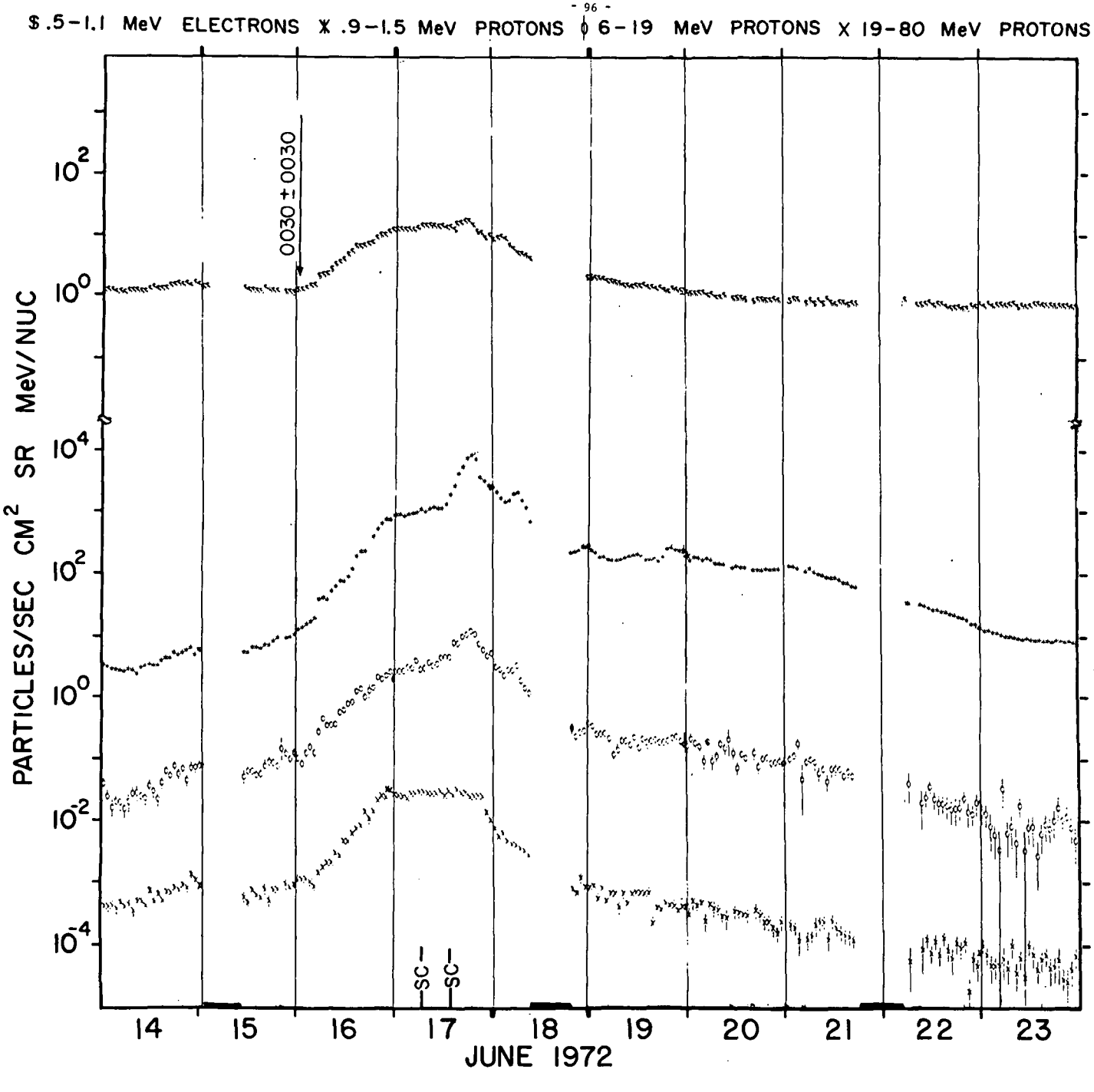
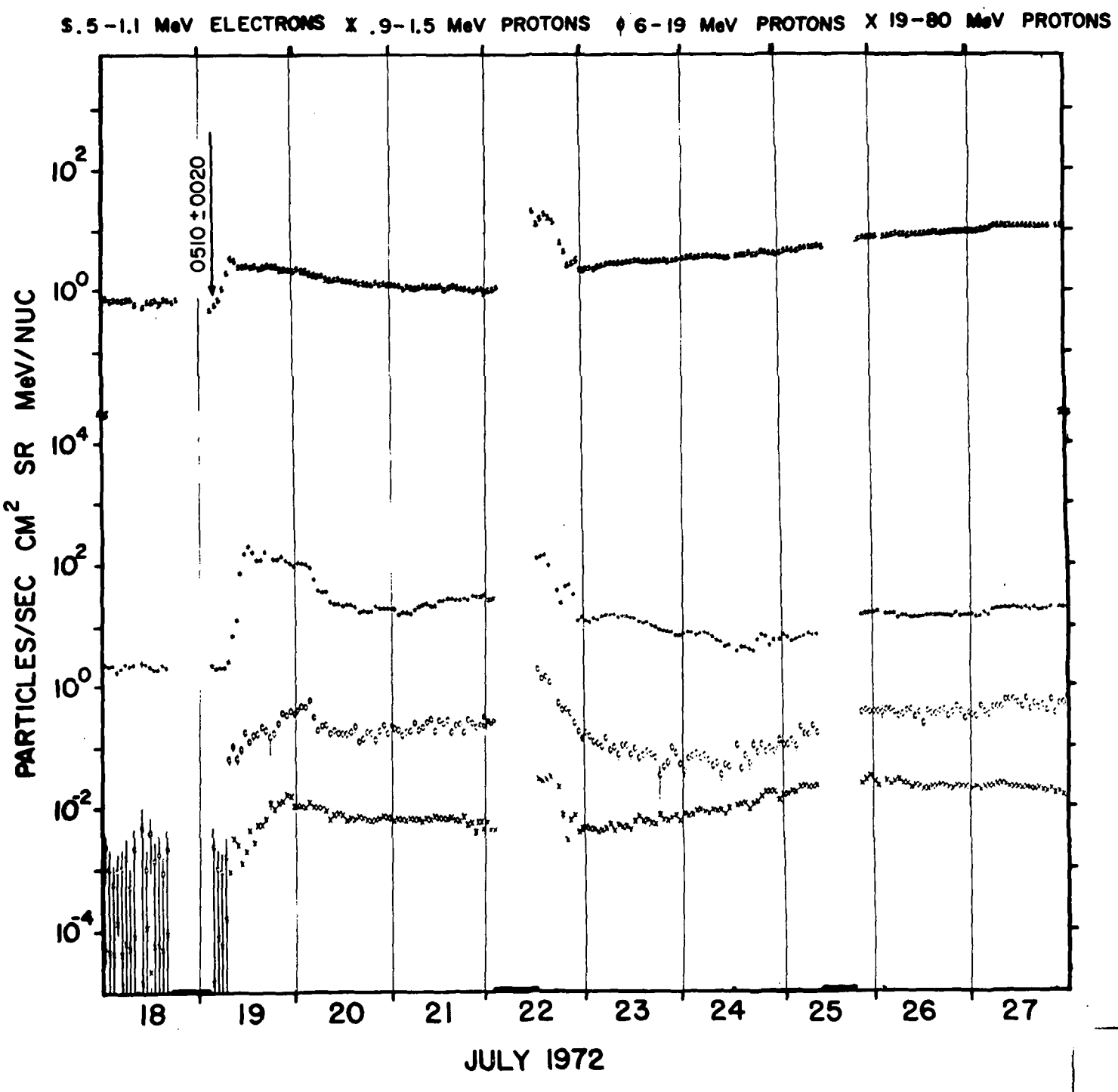
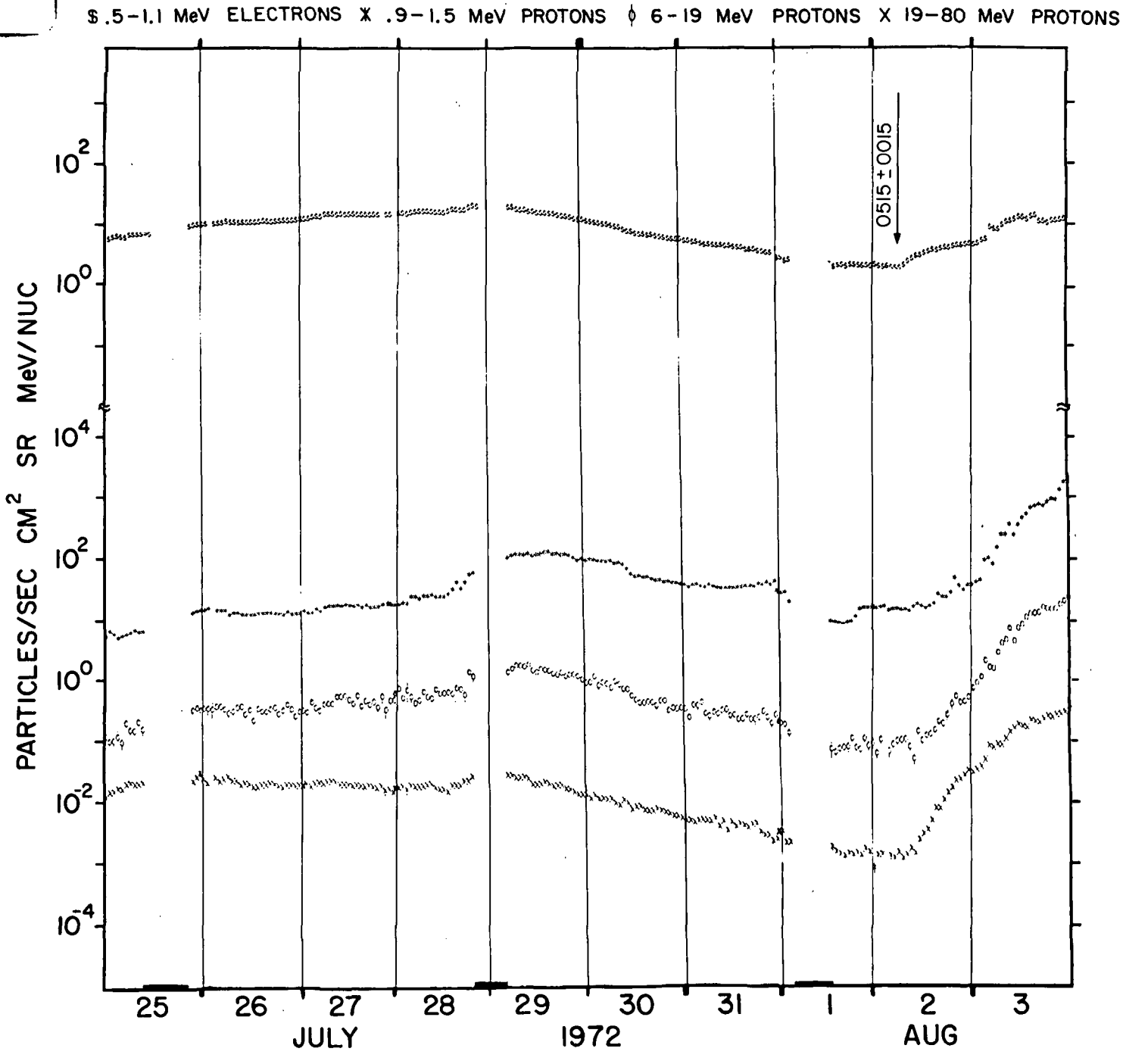
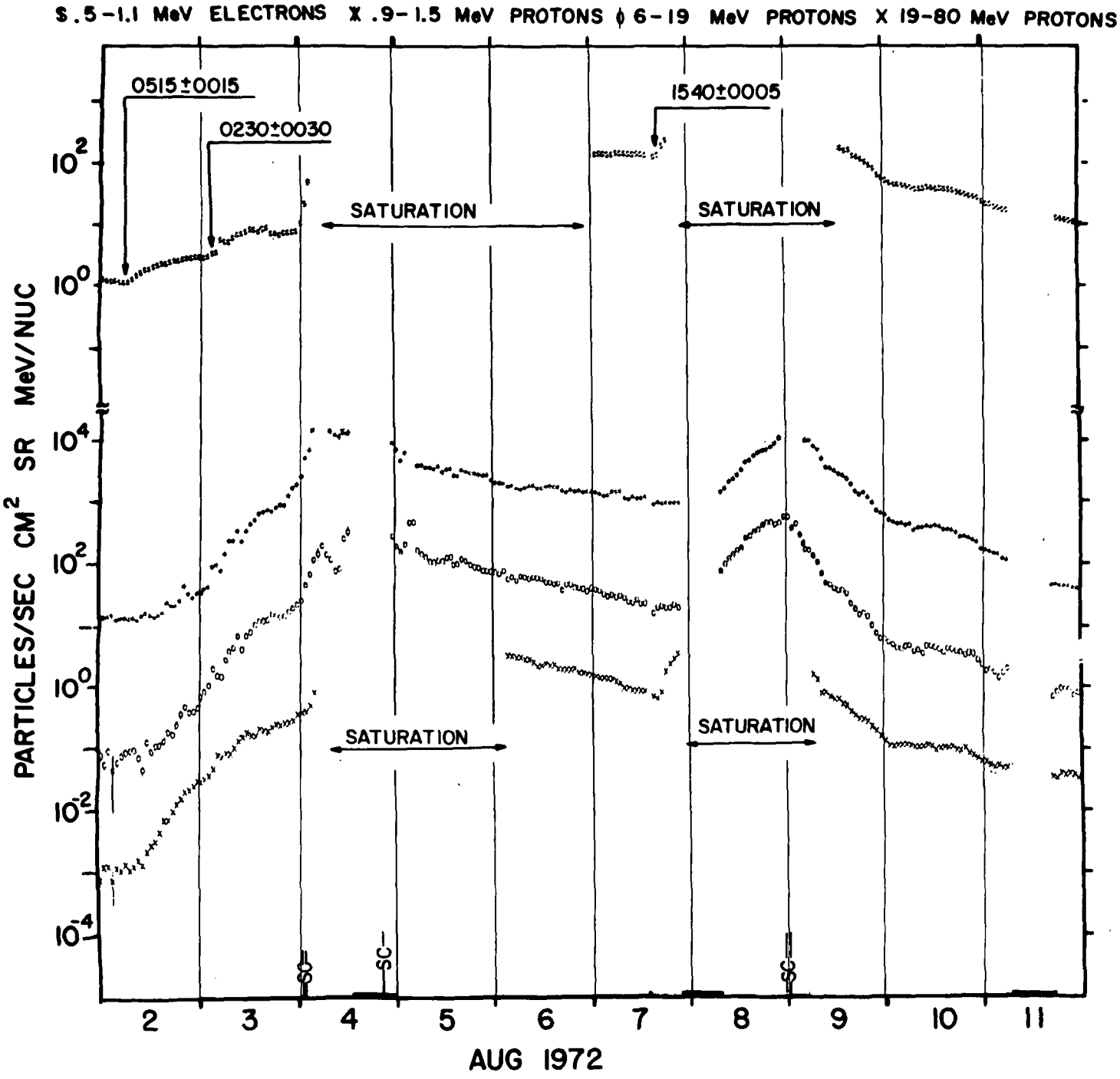
29
30
31
1
2
3
4
5
MAY
1972
JUNE


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2100±0200
6
7
8
9
10
11
12
13
14
15
JUNE 1972


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0030 ± 0030
SC—
SC—
14
15
16
17
18
19
20
21
22
23
JUNE 1972


.5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
0510 ± 0020
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
18
19
20
21
22
23
24
25
26
27
JULY 1972


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
0515±0015
25
26
27
28
29
30
31
1
2
3
JULY
1972
AUG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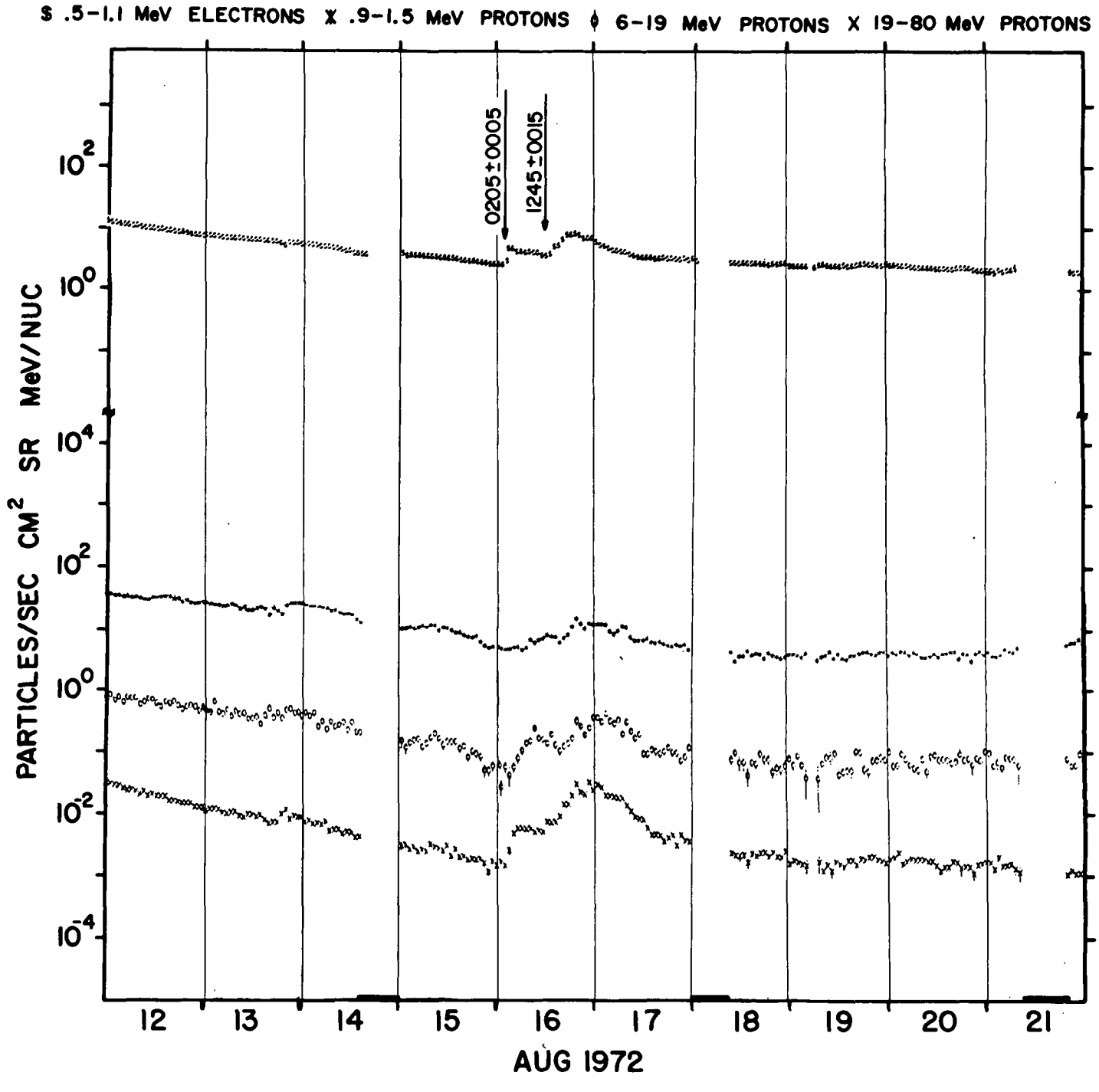
0515±0015
0230±0030
1540±0005
SATURATION
SATURATION
SATURATION
SATURATION
SC
SC
SC
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2
3
4
5
6
7
8
9
10
11
AUG 1972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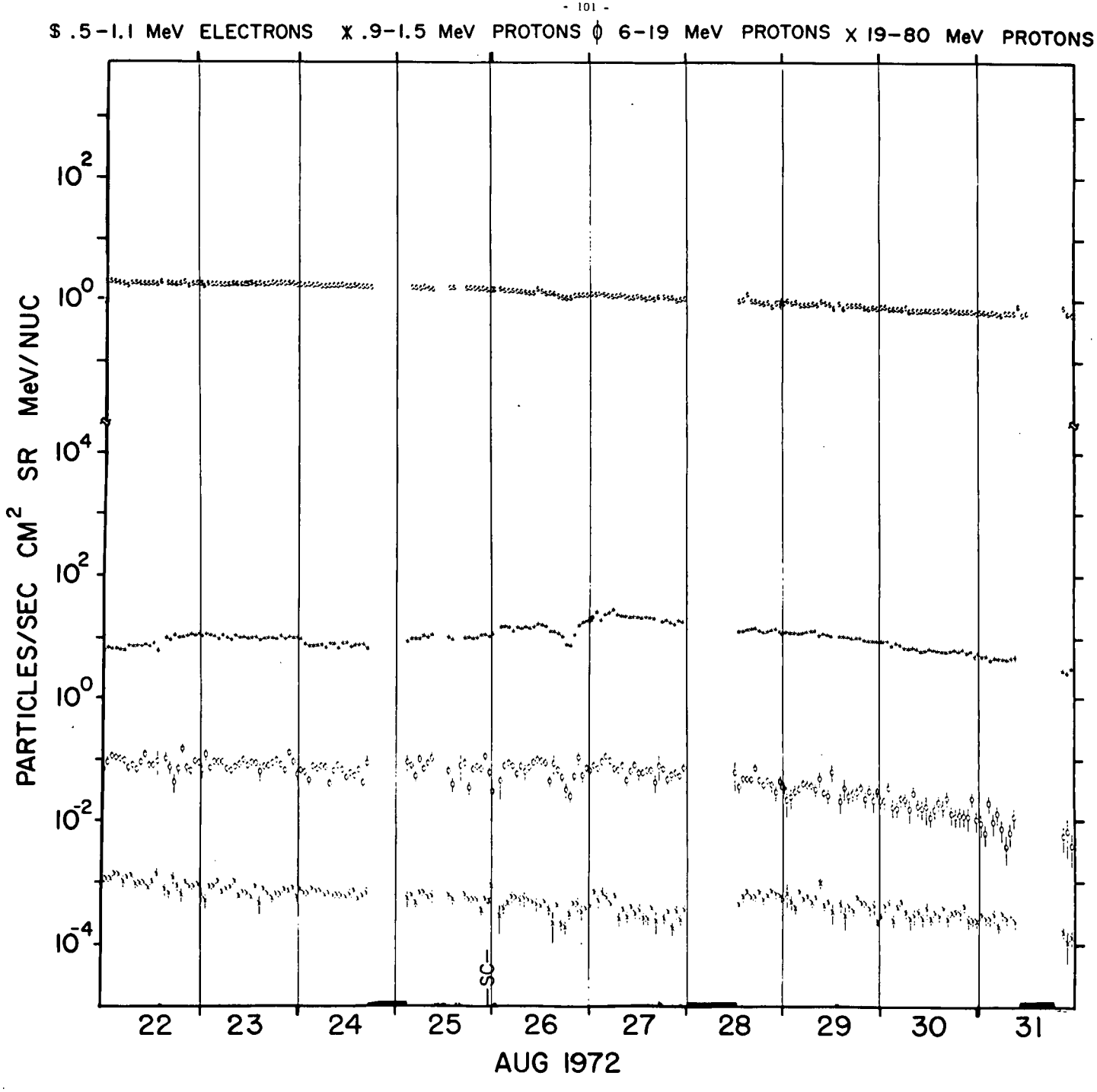
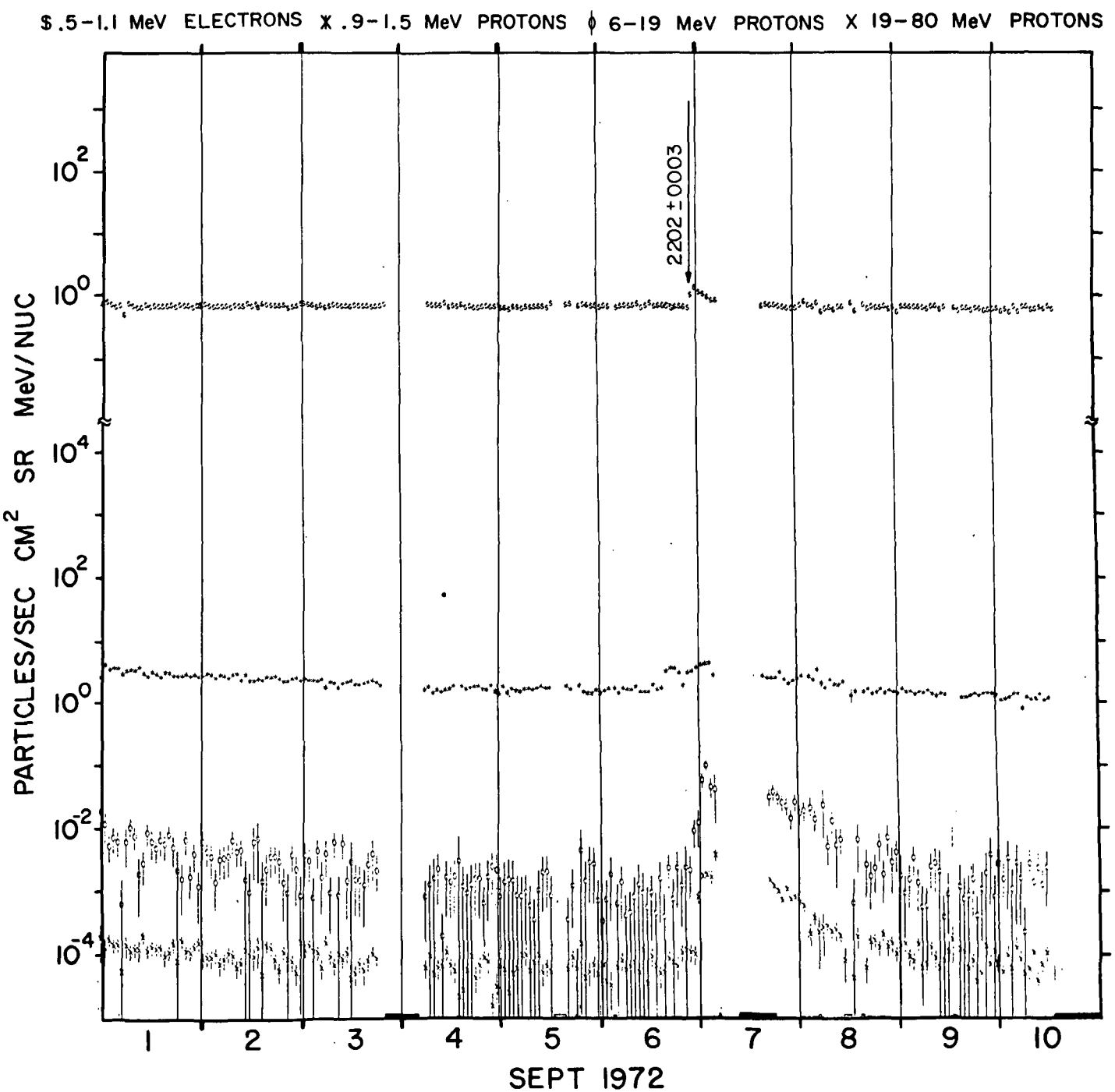
0205±0005
1245±0015
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
12
13
14
15
16
17
18
19
20
21
AUG 1972


$ .5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
ϕ 6-19 MeV PROTONS
X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
SC
22
23
24
25
26
27
28
29
30
31
AUG 1972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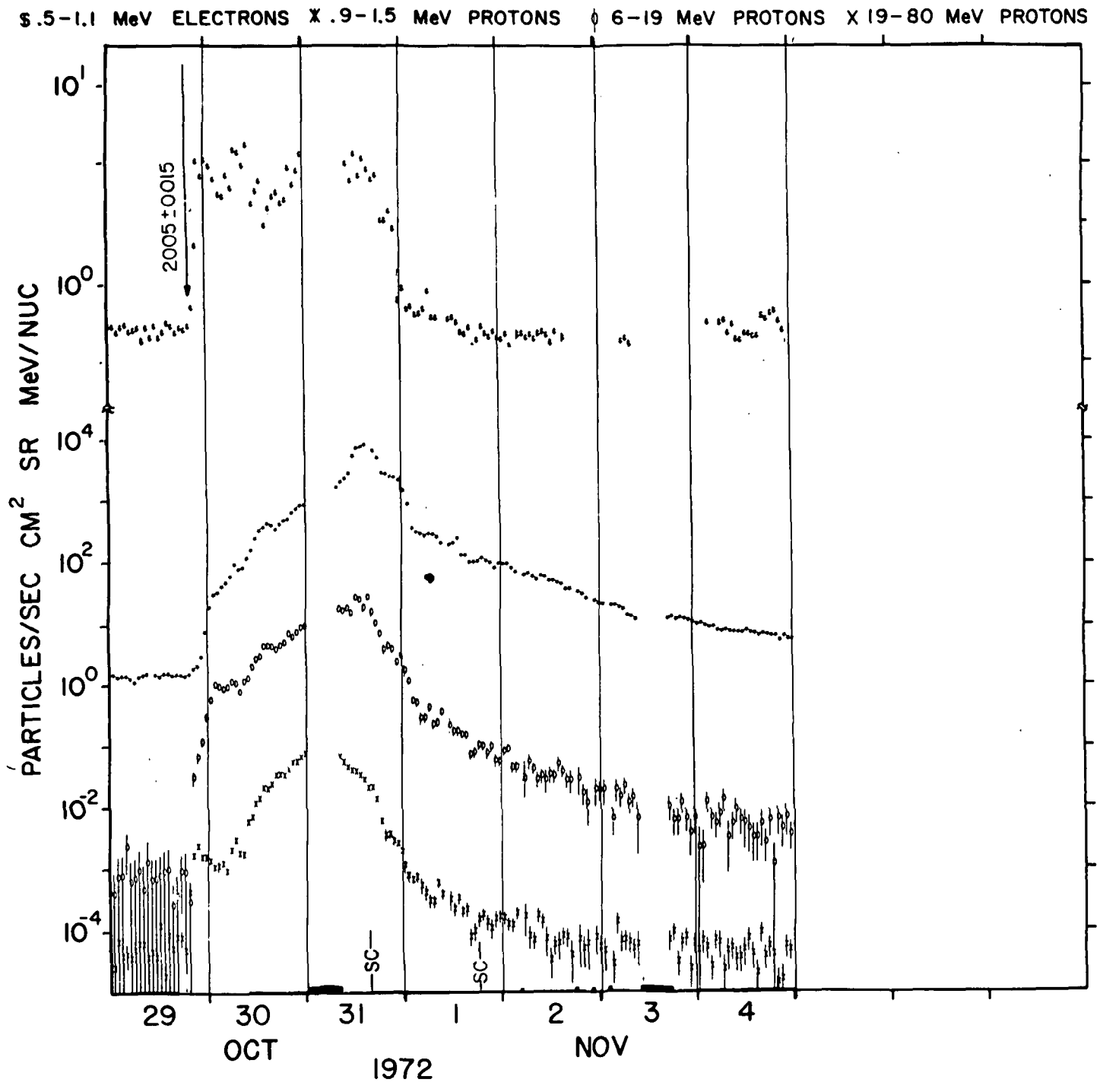
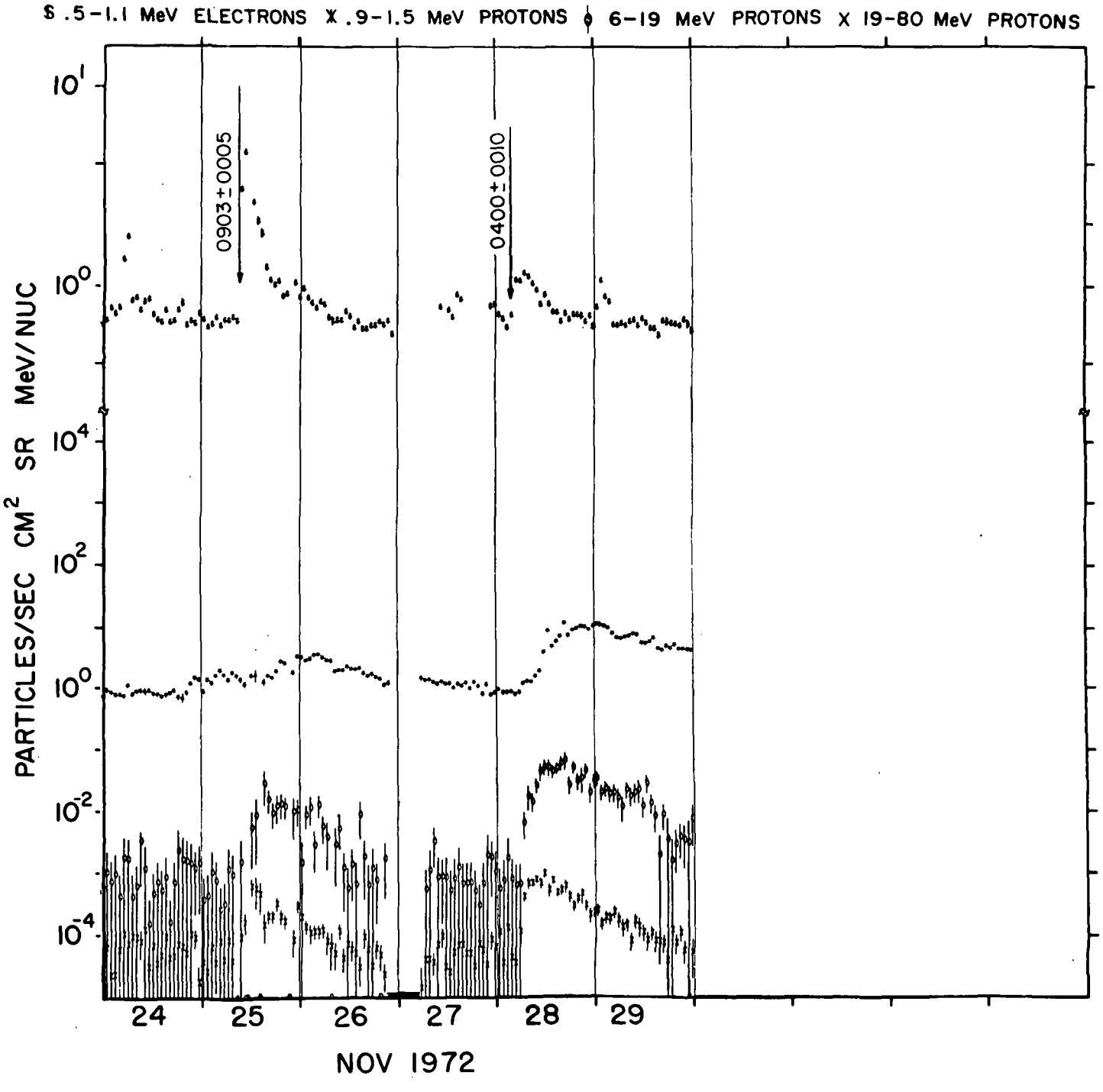
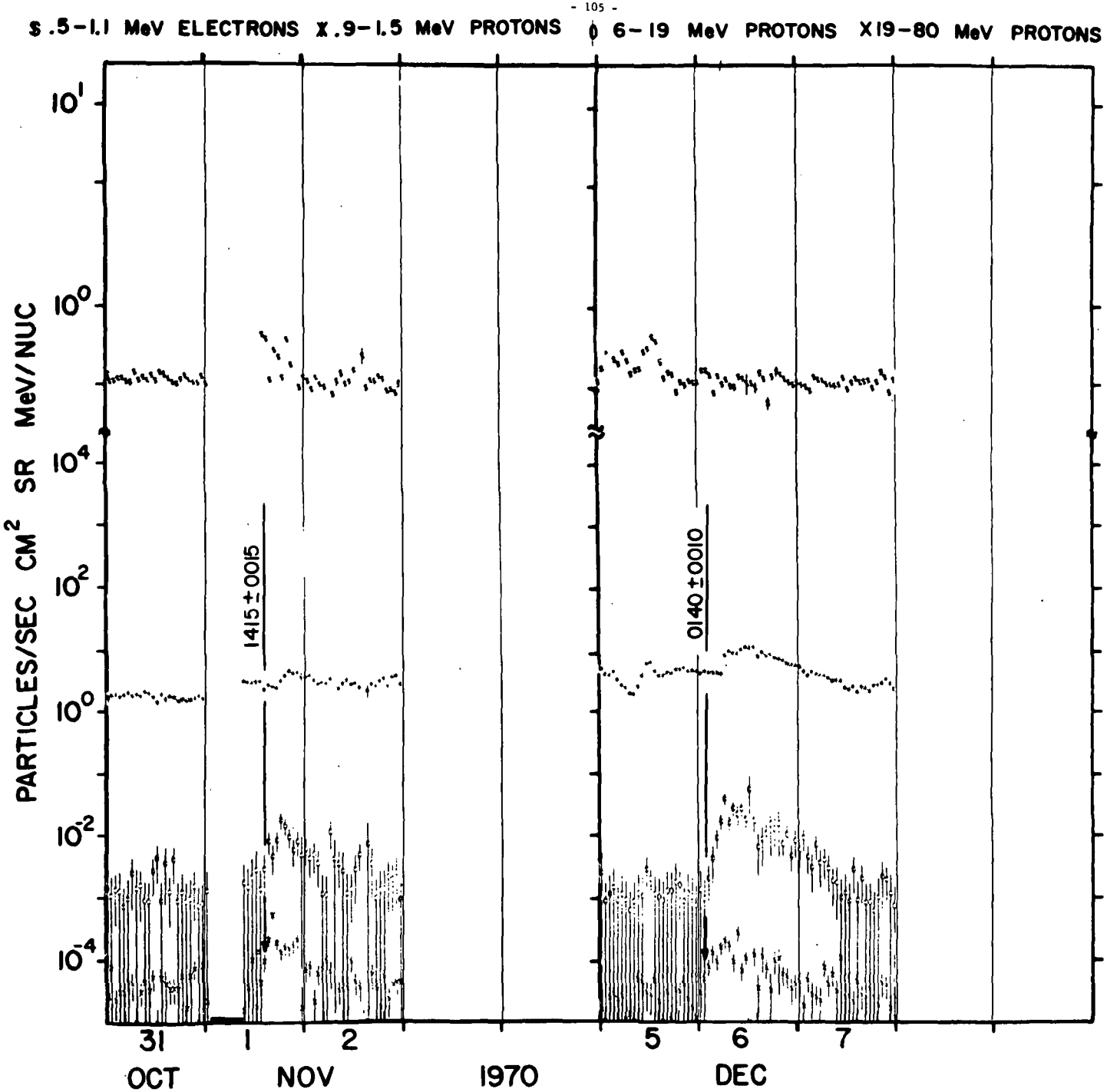
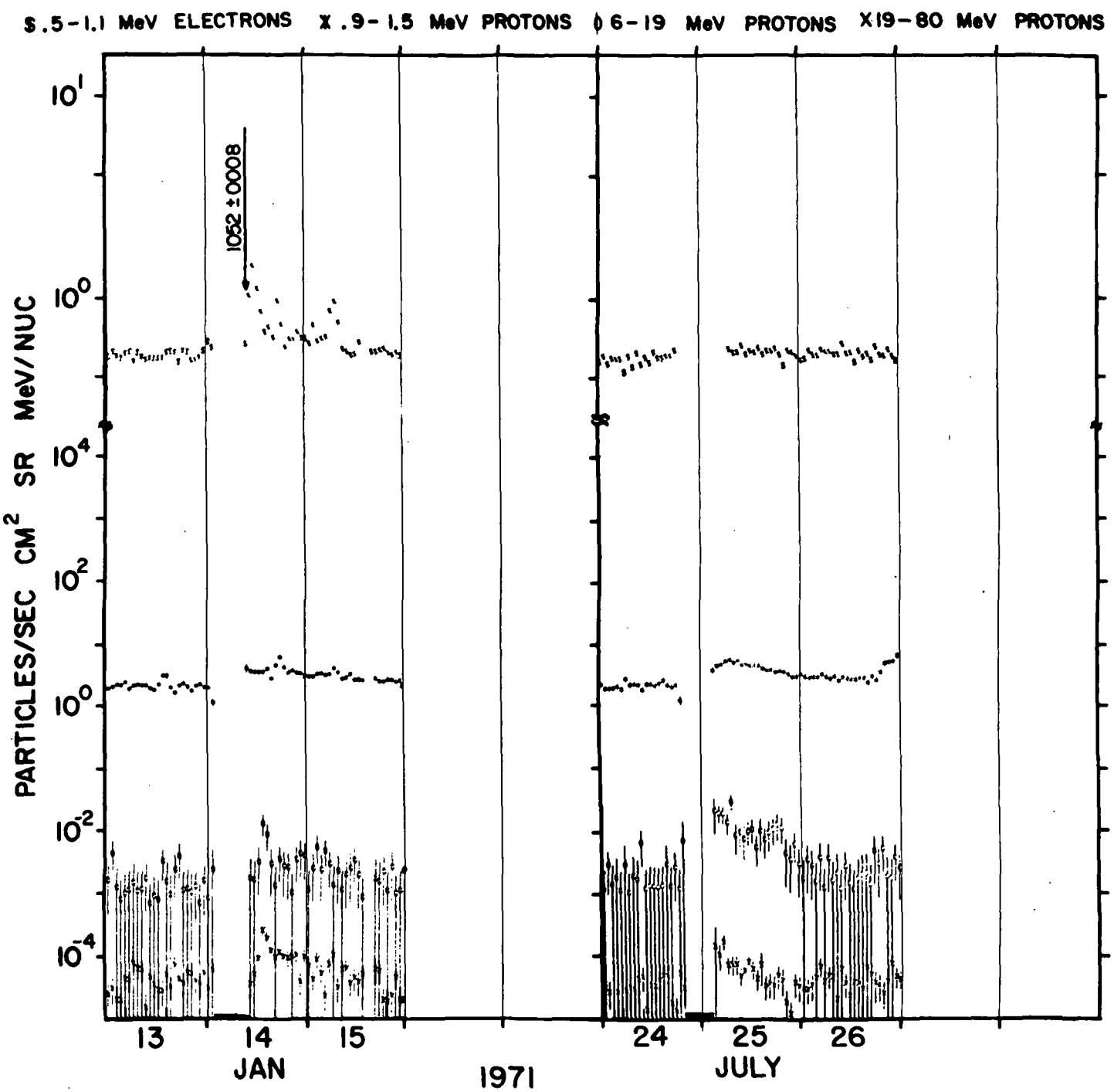
2202 ± 0003
PARTICLES/SEC CM² SR MeV/NUC
10²
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1
2
3
4
5
6
7
8
9
10
SEPT 1972


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
2005±0015
SC
SC
29
30
31
1
2
3
4
OCT
NOV
1972


$ .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS ϕ 6-19 MeV PROTONS X 19-80 MeV PROTONS
PARTICLES/SEC CM2 SR MeV/NUC
10^1
10^0
10^4
10^2
10^0
10^-2
10^-4
0903±0005
0400±0010
24
25
26
27
28
29
NOV 1972


S .5-1.1 MeV ELECTRONS X .9-1.5 MeV PROTONS O 6-19 MeV PROTONS X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1415±0015
0140±0010
31
OCT
1
NOV
2
1970
5
6
7
DEC


$.5-1.1 MeV ELECTRONS
X .9-1.5 MeV PROTONS
◊ 6-19 MeV PROTONS
X19-80 MeV PROTONS
PARTICLES/SEC CM² SR MeV/NUC
10¹
10⁰
10⁴
10²
10⁰
10⁻²
10⁻⁴
1052 ± 0008
13
14
15
JAN
1971
24
25
26
JULY